SOUTHERN
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Something About Rayon

Address by Charles E. Lord, President of the Aberfoyle Manufacturing Company, Chester, Pa., before Southern Wholesale Dry Goods Association.

THE rapid development of rayon as a textile fibre (a matter of general interest) is of particular importance to those living in our Southern States, where the production of cotton is such an important factor in their prosperity, because of its promise to enhance materially the use of that staple.

Rayon will not supplant cotton even to a fraction of the small percentage represented by their relative production, but will, instead, by broadening the field of cotton manufacture, materially increase the use of cotton and the activity of the cotton mills of the world. If there is any supplanting of another fibre by rayon, it is apt to be natural silk, and even that is likely to be unimportant and of a transient character. This new fibre will simply enlarge the field of textile production, and use, by the introduction of new forms of beauty and attractiveness which will tend to increase the total consumption of textiles. It may be the means, to an extent, of taking up the slack now existing because of a post-war capacity for the production of textiles in excess of present needs. As a further comment upon its bearing on cotton, it is important to note that in at least one process, the viscose, raw cotton is used as well as wood pulp as the basic material from which to make rayon.

The raw material for rayon stands independent of changes of seasons or climate and, gives us the first "stabilized" fibre. This stabilizing possibility, arising from its ability to use a material of non-fluctuating value, has been wisely handled by the manufacturers of rayon, who have avoided any voilent fluctuations in their selling prices, even when the demand has been most urgent, and obtained uniform and reasonable prices for several years without change, so that all those handling the products made from rayon might do so with a feeling of security against any basic disturbance of value in the raw material.

Method of Processing Rayon.

The matter of process is an important one, not only because of the difference in manufacture but also because of the varying properties and reactions of artificial silk produced by different methods. There are four processes now in use to a greater or less degree, namely: Nitro-Cellulose, Cupro-Ammonium, Cellulose Acetate and Viscose. These differ basically in the solvents and methods used in converting cellulose to liquid form for transforming it into threads or filaments. It is hardnecessary to discuss technically, even if I were qualified to do so, the methods followed in the instance of each of the different processes, but I will refer briefly to the viscose process, which represents, as stated, three-quarters of the world's production, and is most generally known and understood as rayon.

Quoting from "The Story of Rayon," issued by the Viscose Co., I would refer to the seven distinct steps between the preparation of the cellulose and the final packing of the finished yarn, as follows:

1. Making and purifying cotton or wood pulp for cellulose base.

2. Mercerizing, consisting of caustic soda treatment, forming alkali cellulose.

3. Treatment of alkali cellulose with carbon bi-sulphite, forming cellulose xanthate.

4. Mixing of cellulose xanthate with caustic soda liquid to form cellulose solution.

5. Spinning cellulose solution into threads.

6. Reeling threads into skeins and finishing.

7. Preparation of skeins for textile mills.

The raw stock in the form of spruce-wood or cotton is cooked by the aid of live steam in a large boiler called a digester. This cooking, with the assistance of chemicals, removes foreign matter from the natural cellulose. The mass is then thoroughly washed, freed from the chemicals and bleached to bring it to a proper degree of whiteness. The cellulose now consists of minute short fibres which are run through rollers to squeeze out water and compressed into sheets which are cut into squares and soaked in a solution of caustic soda for about 24 hours. The excess liquor is then forced out by hydraulic presses and the sheets cut into small particles by revolving knives and kept in specially constructed containers for about forty-eight hours. This product, now called "alkali cellulose," is subjected to a variety of chemical treatments, which would occupy too much space to describe in detail, until finally reduced into one uniform mass which has been carefully filtered, and the solution, which is strongly alkali, hardens upon coming in contact with acid, thus reverting the cellulose to a solid form by neutralizing the alkali. The mechanical part of the operation, simply stated, consists of forcing the viscose through a plate containing fourteen or more holes, which is immersed in an acid bath. The viscose, on leaving the plate, is immediately hardened or reverted by the acid and drawn away from the plate before it has time to merge or run together again. It is then spun into a thread, and after being properly aged and submitted to some further treatment, becomes what is known as rayon, ready for manufacture into fabrics, and is graded A, B and C for quality.

Characteristics of Different Rayon.

I have referred to the viscose process because it is the one most generally in use and represents the great bulk of the product known as rayon and not with any view to disparaging even indirectly artificial silk made by other processes, as each process produces a fibre with distinct characteristics of its own and excelling in one respect or another for some particular use. The product of each of these various processes differs in numerous respects.

To mention a few of these differences, I might refer to strength, luster and character of dyes which the fibre will take. It will be seen that a selection must be made by the manufacturer of the character of rayon or artificial silk which will best meet the requirements in use of the woven or knitted fabric he proposes to manufacture; and a measure of the dissatisfaction which has arisen in the instance of some rayon materials is due to a failure to know or understand the characteristics of the fibre used and even, in some instances, the indiscriminate use of several different makes of fibre in producing one line of merchandise.

The four familiar fibres, cotton, wool, silk, and linen, each possesses indivdual qualities requiring separate and particular treatment in manufacture into cloth, and because the use of those fibres is centuries old the methods of treatment are generally and thoroughly known to those manufacturing goods from them. Like those other fibres, rayon has its peculiarities and has to be handled understandingly, but its recent adoption has precluded the building up of common experience as to its proper handling. Textile manufacturers may know all about the proper treatment of cotton, wool, silk and linen, but few as yet understand the proper treatment of rayon, although with growing experience that difficulty should shortly disappear and the production of quality rayon fabrics become more general. Manufacturers must study the properties of the rayon used, be prepared to give the yarn the careful and intelligent treatment it requires in the course of conversion into fabrics, realize that properly handled it produces one of the most attractive and serviceable articles for personal wear or the adornment of our homes, while improperly or carelessly manufacturer it is of little use or merit, and so keep their efforts on quality rather than on cheap production. The use of the material will grow through the satisfaction of consumers and not be even temporarily interrupted through the exploitation of the consumers' present favorable attitude by imposing on him unsuitable or imperfect fabrics.

If there is any present danger to you gentlemen of the Southern Wholesale Dry Goods Association in the rapid increase of the use of rayon fabrics and garments the last two years, it lies in the possibility that unsuitable material, which has unfortunately been produced in many inexperienced quarters and sold at what look like attractive prices, may in use so disgust the consumer that for several seasons, and until he has learned to distin-

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Recommend Rayon Specifications

AT a recent meeting of sub-committee XV of Committee D-13 of the American Society for Testing Materials, the following specifications and tests for rayon were recommended to the trade. The committee makes the recommendations with the hope that they will be studied by rayon producers and users and that suggestions and criticisms be freely offered.

Definitions.

I. General.

1. Rayon (formerly known as artificial silk). The generic name of filaments made from various solutions of modified cellulose by pressing or drawing the cellulose solution through an orifice, and solidifying it in the form of a filament, or filaments, by means of some precipitating medium.

2. Rayon yarns are composed of more than one continuous rayon filament.

3. Spun rayon is yarn made from cut rayon filaments, the cut filaments being twisted and drawn out into a yarn by usual spinning processes.

II. Classification.

4. Nitro-Cellulose (Chardonnet)—The name for filaments composed of a regenerated or denitrated cellulose which has been coagulated or solidified from a solution of nitrated cellulose.

5. Viscose—The name for filaments composed of a regenerated cellulose which has been coagulated or solidified from a solution of cellulose zanthate.

6.Cuprammonium—The name for filaments composed of a regenerated cellulose which has been coagulated or solidified from a solution of cellulose in ammoniacal copper oxide.

7. Cellulose-Acetate — The name for filaments composed of an acetic ester of cellulose which has been coagulated or solidified from its solution.

Identification.

8. Any rayon tested by these methods shall be in the bleached or unbleached state and shall be free from oil or other foreign substance.

III. Tests to Distinguish Cellulose-Acetate from All Other Rayons.

9. Twist fibres to tight wad and cautiously approach to match flame.

(a) Cellulose-actate rayons "melt" or "fuse" and burn more slowly than other rayons, and harden at once into a brittle substance, globular in appearance.

(b) Viscose, nitro-cellulose and cuprammonium rayons all burn like cotton, that is, with no odor and leaving very little ash.

10. Cellulose-acetate is readily soluble in pure acetone in concentrations of not over 1 per cent. This serves as a confirmatory means of differentiating cellulose-acetate rayons from other rayons which are not soluble in this solution.

IV. Test to Distinguish Nitro-Cellulose Rayon from Viscose and Cuprammonium Rayons.

11. Moisten the thread with a solution consisting of 1 per cent diphenylamine in concentrated sulphuric acid.

(a) Nitro-cellulose rayons assume immediately a deep blue color. The fibres dissolve rapidly to a blue solution.

(b) Viscose and cuprammonium rayons are not colored blue and dissolve more slowly.

V. Test to Distinguish Cuprammonium Rayon from Viscose Rayon.

12. Immerse the thread for one minute in a boiling solution consisting of 1 per cent silver nitrate, 4 per cent sodium thiosulphate and 4 per cent sodium hydroxide.

(a) Cuprammonium rayon will remain unstained.

(b) Viscose rayon will be stained a brown or reddish brown color. This reaction will also produce a brown stain on nitro-cellulose rayon.

Note: Preparation of test solution: Dissolve the silver nitrate and sodium thiosulphate separately. Add the first to the second and the cloudiness will disappear. Add the previously dissolved sodium hydroxide. Make up to correct volume, bring to a boil, and filter.

Tolerances.

VI. Size or Yarn Nnumber (Denier,.

The denier of a yarn is the weight in grams of 9,000 meters.

13. Rayon Yarn—The average size or denier of each skein as supplied by the seller either bleached or unbleached, as found by test, shall not vary more than 10 per cent or below the specified size or denier.

14. Rayon Yarn—The average size or denier of each case of skeins, tubes, spools, cops, pirns, cones, or a beam warp of yarn in the singles, either bleached or unbleached, as found by test shall not vary more than 5 per cent above or below the specified size or denier.

15. Spun Rayon Yarn—The average size or denier of each case of skeins, tubes, spools, cops, pirns, cones, or a beam warp of yarn in the singles, either bleached or unbleached, as found by test, shall not vary more than 5 per cent above or below the specified size of denier.

VII. Twist and Direction of Twist.

16. Direction of Twist—The yarn shall be considered to have a right hand or regular twist if, when it is held vertical, the spirals or twist are seen to incline upwards in a left-hand direction.

17. The average twist of each case of skeins, tubes, spools, cops, pirns, cones, or a beam warp of yarn shall not vary beyond the limits specified in the following table:

Turns Per Inch	Allowable Variation
Under 7½	25%
7½ to 10	15%
Over 10	5%

VIII. Strength.

18. The average tensile strength of each case of skeins, tubes, spools, cops, pirns, cones, or a beam warp of yarn in the singles, or plied, either bleached or unbleached, as found by test, shall not be less than the specified strength.

19. Uultimate strength, or strength at the highest yield point, may be specified.

Test Methods.

1X. Size or Yarn Number (Denier).

A—Preferred Method.

20. The number or denier shall be determined (except when the rayon is on beams) from skeins which have been prepared, reeled and weighed in an atmosphere of 65 per cent relative humidity and 70 degrees Fahenheit, kept in rapid motiton by an electric fan, after the spools, cops, tubes, cones, skeins, or other packages from which the test skeins are to be reeled have conditioned in this atmosphere, kept in rapid motion by an electric fan, for three hours when in skeins, and twelve hours when in any of the other forms.

21. Any reel having a perimeter of 112.5 cm. may be used. (See note.) For yarns in skein form, a speed of 100-150 R. P. M. shall be used. For yarns on spools, cops, tubes or cones, the yarn shall be drawn off over end and a speed of 200 to 300 R. P. M. of the reel shall be used. The tension on the yarn shall not be heavier than is necessary to lay the yarn smoothly on the reel at het specified speed. The skeins shall be weighed separately on a balance which shall be accurate to 25 per cent of the average weight of one skein.

22. Two skeins of 2000 turns each from each of 10 spools, cops, tubes, cones or skeins, from one case out of every 10 cases shall be made, and the average of these 20 tests shall be the size or denier.

23. Rayon received on beams shall be tested as specified.

24. The size of yarn number in denier is calculated as follows:

Size or yarn no.=Wt. of 225 meter skein (gr's) x 40

25. The yardage per pound of rayon of any given denier may be calculated by the following formula:

$$\text{Yards per pound of rayon} = \frac{44{,}464{,}528 \text{ (yds. per lb. of one denier yarn)}}{\text{Given denier}}$$

B—Alternate Method.

26. The winding and weighing of the skeins shall be carried out under prevailing atmospheric conditions, following in all other respects the procedure outlined in Method A. The results thus obtained shall be reduced to a common basis of standard moisture regain for the class of rayon under test by the following formulae:

27. For nitro-cellulose, viscose and cuprammonium rayons—

Denier corrected to 11.5 per cent moisture regain=

$$\frac{\text{Denier x } 111.5\%}{(100\% + \text{actual \% of regain})}$$

For cellulose-acetate rayons—

Denier corrected to 6.5 per cent moisture regain=

$$\frac{\text{Denier x } 106.5\%}{(100\% + \text{actual \% of regain})}$$

28. To determine the actual percentage of moisture regain present in the sizing skeins, two groups of three skeins each shall be taken immediately after weighing and the weight of each group recorded. They shall then be placed in two separate baskets in a conditioning oven and dried to constant weight on a balance sensitive to 0.25 per cent of the average weight of one skein at 105 degrees C.—110 degrees C. (221 degrees F.—230 degrees F.). The moisture regain of each group shall then be computed as the percentage of the dry weight and the average of these two shall be the actual percentage of moisture regain in the sizing skeins.

Note: In a laboratory which is equipped for testing cotton yarns only, the skeins may be prepared on any reel having a perimeter of 1½ yards. Each skein must contain 200 ends as before.

If a skein of this length is used the yarn number or denier must be calculated by means of the following formulae:

If the weighing is made in grams—

$$\text{Yarn no. or denier} = \frac{\text{Wt. of 300 yd. skein (gr's. x 1.64)}}{\text{.05 grains per denier}}$$

If the skeins are weighed in grains—

$$\frac{\text{Wt. of 300 yd. skein (grains) x 1.64}}{\text{.7716 grains (per denier)}}$$

X. Strength.

A—Preferred Method.

29. One skein from each of the ten spools, cops, tubes, cones or skeins drawn from a sample shall be prepared as described under Size or Yarn Number. The number of turns in these strength skeins shall be as specified in Table I. For sizes which require 200 ends, ten of the sizing skeins may be used if desired.

Table 1.

Denier of Rayon	No. of turns in strength skein
1— 50 denier	400
51— 75 "	200
76—120 "	150
121—200 "	100
Over 200 "	60

30. After conditioning for at least three hours in an atmosphere of 65 per cent relative humidity and 70 degrees Fahrenheit, kept in motion by an electric fan, these ten skeins shall be separately broken on an automatic power yarn tester of inclination balanced type of 25 Kg (55 lbs.) or 50 Kg (110 lbs.) capacities. The lower capacity shall be used until the swing of the pendulum exceeds an angle of 45 degrees from the vertical. When yarns break

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Long Draft Spinning Cuts Costs

Address by Arthur L. Emery, Agent Wamsutta Mills, before National Association of Cotton Manufacturers.

LONG draft spinning is not a subject that is particularly new. Many of the mills in this country have been experimenting for a number of years, especially on the longer staples. Long drafting can and has been greatly misused with the result that there are some who are rather inclined to be skeptical about it, and undoubtedly they have logical reasons for being so. This is a subject which must be treated with a great deal of good, plain common sense, and each individual must determine beforehand exactly what he wishes to acquire. He must know whether he will be satisfied to reduce his cost, and still produce a yarn of equal quality, or improve the quality of his yarn with a smaller saving per spindle or pound. For example, at the Wamsutta Mills, we are making yarn on long draft system, which is equal to the yarn made on the short draft, and saving from 5 to 6 cents a pound. By reducing the saving 1 or 2 cents a pound, a yard can be produced that is superior to that made on shorter draft.

Will Not Eliminate All Unevenness.

Since the founding of the cotton industry it has been and is today an acknowledged fact known to us all that doublings must be used to cover unevenness. We have been forced to do this to overcome faults that are inherent in the manufacture of cotton into thread. In other words, it seems to me that instead of doing this, we should have been getting at the source of all the trouble. I do not claim that long draft spinning will eliminate all unevenness, because some of it is created in preceding processes, but it is my contention that if the individual fibers are so controlled that they go into the strand of roving or yarn in the place in which they should go, that a much longer draft can be used. Long drafting means just this: Each fiber is placed in its own individual place. In a bale of cotton, using for example 1¼-inch staple, there are 50 per cent of these fibers that are not 1¼ inches long. The same variation applies to different staple lengths. In order not to have cockled yarn on the regular draft, we are obliged to set the rolls on the staple or just beyond, the depending on whether or not there is weight on the middle roll. The result is that the shorter fibers are not controlled, but have at least one end free, and are not located in the strand where they should be.

Any long draft system is based on the theory that both ends of the individual fibers are under control, due to the fact that the point of contact between the drawing rolls is considerably less than the shortest fibers that make up the cotton. I believe that the speeder destroys the fiber, and the more processes through which the cotton is put on this machine, the more unevenness will occur. In theory, if yarn could be taken from the drawing frames, much evener sizing would be obtained.

They are experimenting in Europe on a drawing frame now, with an object of going still further and eliminating processes. Just how far they will be able to go I cannot say at the present time. While I was in Europe I saw a large number of spindles running on long draft. These were in Italy, France, Spain and England. After noting the results obtained on the Continent, I was thoroughly sold on the proposition of long drafting, but when I reached England and saw the interest taken there by the manufacturers, I was more convinced than ever, for the Englishman is very conservative and slow to make changes until he is very sure he is bettering himself. I had the pleasure of lunching one day at one of the largest manufacturers of cotton machinery in England, with about a dozen of the leading men in their organization. They were definitely recommending long draft spinning. It is the same with other manufacturers of textile machinery.

The Shirley Institute of Manchester, Eng., composed of a body of scientific textile men supported by the mills and machinery makers of England, made very exhaustive tests (between one and two billion covering a period of two or three years) and they have issued a report that it was impossible to determine the difference between yarns made on long and short draft spinning. I think these tests are of great value because one might not get proper results from a small test. The tests were sufficiently large in number and spread over a period of time which would allow for climatic changes. This fact cannot be passed by without serious consideration. These men are unprejudiced and carried on their tests from a scientific point of view. An ordinary layman would be unable to accomplish this. As an illustration, I would like to tell you of the results obtained in long draft at the Wamsutta Mills.

On the short draft system we

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The European Situation of 1926

Address by Henry M. Robinson, President, First National Bank of Los Angeles, Calif., before National Foreign Trade Council, Charleston, S. C.

THE European situation in 1926, neither presently nor for the balance of the year, will be any more static than a group of Dr. Millikan's electrons that perpetually shoot about bumping into one another, glancing and richocheting—in fact, nothing but a kaleidoscopic relativity.

Secretary Hoover describes foreign trade as "A maze of different phases of production, distribution, international finances, international relations, tariffs, trade discriminations, allied debts, controls of raw materials, fashion, weather and the shifts of economic forces of all sorts." This description applies with equal effect to any definition of the European situation and to follow the electron analogy further the two outstanding factors about which the factors in the Hoover description revolve and center and which for the present, at least, constitute the nuclei about which the electron factors revolve, are reparations and currency stabilization.

In respect of reparations, let us not be stampeded by the hue and cry set up in so many of the allied countries that Germany cannot pay. Let us not accept as definite and certain that unstable currencies are finally to become valueless with all that such eventualities import.

Have you noticed how very frequently of late certain ecnomists and publicists, nationals of the allied countries, and even of our own, keep stressing the statement that with the coming of the standard annual reparations payment, the burden will be too great for Germany to bear?

Inasmuch as many of the allied countries are endeavoring to bring about at least a tacit understanding that payments to the United States are not to be made except as reparations payments are made by Germany, would it not be better form for the leaders to desist from the reiteration of Germany's inability to pay, and that especially is this true if they even have mental reservations about payments to the United States unless reparations are paid? When international obligations are in the control of democracies, experience has not shown that the democracies have a full and complete understanding of the ethics of contract fulfillment. May I add that there are those who claim that our own democracy does not always recognize its ethical duty in its relation to other nations.

We all know that the government for the time being, in any democracy, may be displaced and what better domesitc platform for those out of office than that the burden placed on the producers and workers is too heavy. It has a strong appeal from every angle and a platform against payments, that can only be made when collected from the constituents of a democracy, would in itself be popular. What better background for such a platform than the assurance on the part of the creditors that the burden is too heavy? What would be the effect if the allied countries bring about a situation where our public believed that our debtors should not be called upon to pay their debts unless Germany pays the reparations and then our debtors, ably assisted and abetted by some of our own people continued in vociferous statements that the burden of reparations on Germany was a staggering one that Germany should not be called upon to meet? Could it be that through this none of the war indebtednesses would be paid and could it be that the international trade in Europe between the nations of Europe could then be carried on on a larger scale more promptly expanded and with less effort than would be possible through what we might consider proper settlements of war indebtedness?

The other day, under a Washington date line, a New York newspaper of the best quality and highest motives, a paper which, in its editorial columns, from my viewpoint, at least, has been, and always is, sound, particularly in relation to the reparations problem, carried a news item with the head line, "Reich Staggering Under Dawes' Plan." The article appeared to be made up of excerpts from statements made by various delegates who participated at the meeting of the International Chamber of Commerce at Brussels last summer, but so set up that an ordinary reading left the impression that it was a statement of the Agent General of Reparations. Part of it was, but certainly not the part that suggested any inability to pay on the part of Germany. The Agent General in the meeting in Brussels, if you will read the report of his full statement, was more than reasonably optimistic about Germany's ability to pay and the burden finally appeared to be payment beginning in 1928-29. This, I think, in a way at least, illustrates my point.

Let us see what has happened in reparations payment—for the first year, ending September 1, 1925, the

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The Story of Cotton

On account of its very interesting observations relative to the early history of cotton and cotton manufacturing, we are printing material copied from a small book, published about 1870, in London, Eng., by the Society for Promoting Christian Knowledge. As the book was not copyrighted and is now evidently out of print, we feel a tliberty to give its contents to our readers, many of whom will be interested in the early history of the industry.—Editor.

(Continued from Last Week)

CHAPTER V.

Hargreaves and Arkwright.

Of these successful inventors, the first, in point of time, was James Hargreaves, an untaught Lancashire weaver, who was born at Blackburn early in the last century. Though he had received little school-teaching he was thoughtful and observant. One day he chanced to see an old-fashioned spinning whel with its single spindle overturned by accident. He fashioned spinning wheel with its single spindle overturned by accident. He continued to revolve, he drew the roving of the wool towards him into a thread. While doing this, it occurred to him that if some contrivance could be made to do the work his finger and thumb were doing, and at the same time be made to travel backwards on wheels, six or eight threads from as many spindles might be spun at once. He thought over the matter till at last he actually made such a machine, and to his great delight, it was perfectly successful. He called it a jenny, some say after the name of his wife. Hargreave was a poor man, and had at this time seven children to maintain, yet during the next four years he made and sold several jennies, reserving one, which he kept and worked in secret, for supply of his own loom.

Everything was going on very prosperously, when his wife and daughters, proud of his ingenuity, began to boast of the great invention. Jealousy was aroused in the neighbourhood. The spinisters, who had up to this time a constant supply of work and good payment, besides the little bribes and presents of the weavers, were afraid of losing their means of a livelihood. No innovation could do them any good, so they set their faces against it. They and their friends rose up in a tumult, burst into Hargreaves' houses, and broke to pieces their rival, the spinning-jenny.

The times were rough, and Hargreaves considered that his life was in danger. He may have been right—anyhow he left the country and went to Nottingham wi'h his family. He he met witha partner who had money enough to set up a spinning-mill on the new plan. It answered well, and Hargreaves continued to improve his jenny, till it would spin as many as eight threads at a time. Now he took out a patent for his invention. Unfortunately, however, those spinning-jennies which he had sold in Lancashire during the days of his poverty, stood in his way. While they were in use, Hargreaves could not by any process of law, prevent any one from copying them, and pirating his invention. Such manufacturers as were already using it in Lancashire acknowledged in some sort their obligation to the inventor. They offered him £3000. He did not think is was enough, and refused it. In the end he got nothing for what was the means of enriching thousands. His jenny, too, was unpopular during his lifetime. A second rising took place, and the country people went about destroying every one of these machines on which they could lay their hands. But all was in vain; the use of them was soon firmly established, and the cotton manufacture received a great stimulus through the clever invention of the poor weaver of Blackburn.

It has often been said that James Hargreaves died in poverty, but such was not the case. The little spinning-mill maintained him and his family in tolerable comfort, and his partners, Messrs. Strutt, of whom we shall hear again, rose to great wealth.

When the spinning-jenny was fairly set to work, spinning went on far more rapidly than before, but the jenny was as powerless as the old spinning-wheel in making cotton yarn of sufficient strength to be used as warp. Linen yarn was still used for that purpose. No cotton thread had yet been spun in England strong enough to bear the tension put up the warp. A further invention was needed before calicoes could be made, as now they are, wholly from the soft down of the wool-bearing shrub.

This difficulty was however soon met. A further invention was devised by Richard Arkwright, the youngest and thirteenth child of a poor man of Preston in Lancashire. Of school education Richard received little, if any, but he had plenty of observation, and was always teaching himself.

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Trademarking..*does it pay?*

Leading manufacturers discuss the value of selvage and end marks

IS there any advantage in trademarking goods? If you do trademark, does it make any difference how you do it? Is one method better than another? Does it pay to be particular about the appearance of the trademark? Here—picked at random—are the opinions of 6 well known manufacturers. Read them — you will find them helpful in deciding your own trademarking problem:

Holeproof Hosiery Co.—"We feel it has proven a good means of protecting the public when purchasing quality goods for which our name stands. After using Kaumagraph Transfers for the last 16 years, we are convinced that this method of identification is one of the best obtainable."

L. C. Chase & Co.—"Our name became so much associated with Mohair Plushes or Velvets, made by Sanford Mills, that with a good many people Mohair Plush and Chase came to mind at the same time. As the demand for this upholstered fabric increased, it was quite natural that a good many inferior imitations were made so that the question arose with us as to how the consumer should be protected. We cast about for some way of marking or stamping our velvet and it is now more than 10 years since we began using your Kaumagraphs. They have proven very satisfactory and provision was accordingly made for stamping the back of every yard of Chase Velmo."

Winsted Hosiery Co.—"We feel that this method of trademarking our merchandise is a very efficient although inexpensive form of advertising. We have been buying Kaumagraph transfers for over 10 years and find that not only the transfers but the service has been satisfactory in every way."

Logan Hosiery Co.—"It insures the user of Blue Line Hosiery against substitution of inferior qualities of hose. We safely recommend Kaumagraph Dry Transfers for any product on which a mark of distinction is required."

A MIGEL FABRIC MADE IN U.S.A.

J. A. Migel, Inc. — "We would be at a loss to know just what other methods we could employ to let the women of America know that the goods trademarked 'MOON-GLO,' 'FAN-TA-SI,' 'SPIRAL SUN,' 'THOROBRED,' and 'VELVA CREPE' are famous Migel Silks."

Society Maid Hosiery Co.—"It will no doubt interest you to know that the continued use of your permanent transfer has assisted us materially in getting 'Miss Ultimate Consumer' to ask for Society Maid Hosiery."

The Kaumagraph Transfer method has been for 25 years the only **practical** method of trademarking textiles. Practically every large textile manufacturer has adopted it. Send today for sample markings and full information.

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Causes of Bad Running Spinning

A series of articles contributed to a Prize Contest of this Subject

Publication of the first four articles contributed to the Prize Contest on "Causes of Bad Running Spinning" are begun on this page. A number of these articles are to appear each week until all have been published and the winners announced. All of them will then be published in book form.

All articles contributed to this contest must reach us by May 15. The rules governing the contest appear elsewhere in this issue.

Number One

I am giving below some of the many causes of bad running spinning:

Improper temperature and humidity that is on the extreme either way.

Spindles and thread guides out of plumb; worn rings and travelers, that are incorrect weight and which do not fit the rings.

Improper setting of top and bottom rolls; rolls poorly covered, cots too short, worn or grooved.

Roving guides not working properly, lack of proper weight on rollers, levers not properly set, necks of back fluted rolls worn so that top back rolls are resting on roller bars instead of fluted roll.

Worn clearers or scavenger rolls, worn or splintered bobbins, poor work in piecing-up so that strings fly out from bobbins and break down ends.

Dirty sides, such as roving creels, rolls, guideboards and wires, ring rails and separators, dirty clearers, speed too high.

Bad skewers, worn flutes and steel rolls, guide wires out or worn, tip of roller bars worn.

The card room may have a lot of roving ahead, which will dry out before it is spun or be stretched from too much tension, making it light, or with too much twist. When this comes in the spinning room, the spinning will run bad although the card room ran all right. There could also be mixing of short cotton while you have the rolls set for longer staple. Some grades of cotton require more twist than others.

The most likely causes of bad running spinning are improper temperature and humidity, dirty frames, rolls not properly oiled and set, worn travelers, roving twisted too hard or too soft, inferior cotton, travelers too heavy or too light.

If I took charge of a room under such circumstances, I would first see that the temperature and humidity were as nearly correct as possible to suit conditions. I would then weigh and break the yarn to see that it was the right number and had the proper strength. Then I would survey my room and make note of everything that I could find wrong. I would see that all machinery was properly cleaned and oiled, rolls properly set and that travelers were of correct weight and fit. If they were not, I would change them.

If spindles were out of plumb, I would have them lined and leveled, spindles and guide wires plumbed, rolls cleaned and polished. Then I would make any other adjustments wherever necessary.

Len.

Number Two

I will try to give a few of the many causes of bad running spinning from practical experience. First I want to relate a little experience that the writer once had at a mill some several years ago. The writer had been overseer of spinning at a medium size mill which was considered a first-class mill, and it really was. He had accumulated a few hundred dollars, and one day he decided to give up the job and go into the mercantile business. (Show the merchants how to sell goods cheap and get rich quick.) So he rented a store room and a cottage, and moved in town. Soon he had a supply of goods in and started business. He lasted about one year, and had a chance to sell out and straighten up, and had about enough cash left to pay a moving bill.

He was offered and accepted a place as overseer of spinning in a small mill, which was not considered a first-class mill at that time. The spinning was running bad and in a mess proper. But they had a good carder who was making fairly good roving, in fact there was no kick on the rov-

ing. But the spinning was going bad, very bad, and so was the weaving It was impossible to make the weaving run good with the warp and filling that spinning room was turning out.

The new overseer of spinning got busy trying to find out what was wrong. And this is what he found: A variation in the draft gears of one to five teeth, a variation in the twist gears of one to three teeth. Several different numbers of travelers on the same counts of yarn. The mill was supposed to be making No. 29s warp and No. 39s filling. The new overseer soon straightened out the draft and twist gears, but had no travelers on hand to change with, but the travelers were promptly ordered and received. The proper style and weight of traveler was put on, and the next day it looked like a different spinning room. This was at a time when help was scarce, and after the above changes were made the spinners took on from two to four sides more and did not have to work as hard as they had been working on less sides.

The superintendent and manager of the mill were carried away with the new spinner. They thought he was some spinner, and I reckon he was for them at that particular time. The new spinner, however, was soon offered a job in a larger and better mill and moved away.

There are so many things to cause bad running spinning, even when the roving is all right, I hardly know where to start. Excessive speed and draft, steel rolls in bad condition, flutes burred up, necks worn and loose in the joints, causing eccentrics which stretch the roving between front and middle rolls to the extent that it makes thin places in the yarn. The top covered rolls in bad condition, worn and roughed up, and bad roller covering. Necks and ends of the roll worn, and the roller bar tips worn to the extent that the roller does not run in line with steel roll. Rolls not properly cleaned and oiled. Front saddles worn, dubbed off on the end so it does not hold roll in proper position or put the necessary weight on the roll. Levers and lever screws worn too much, will not vibrate as they should, flannel worn out or off of the top clearer boards will not keep the rolls cleaned as they should. Roving skewers worn and dubbed off on the end will not allow the roving bobbin to turn free and easy, thus stretching the roving at times. Bad gears, the teeth worn and some broke out.

Separator blades set too close to the rings and sometimes striking the ring and breaking down the end when ring rail comes up.

Bad spindles, crooked and worn out, bolsters worn and causing the spindle to wobble and vibrate, and spindles not properly oiled. Slack bands, not driving spindle up to speed, and bands too large for the whirl. If the band does not run in the bottom of the groove on whirl it will not drive the spindle up to speed, therefore you will not get the proper twist in the yarn. Spindle not in center of the ring. Guide wire not set over the center of spindle, and set too close or too far from the top of the bobbin. Rings worn out, travelers worn and cutting down the ends. Frame not kept clean and properly oiled. If the room gets too cold or chilled it will cause the ends to snap down. Too much or not enough humidity in the room will cause spinning to run bad.

All the above things will cause spinning to run bad when you have good roving, which we do not always have.

Henry.

Number Three

Among the causes of bad running spinning are:

First—Not enough humidity. I would see that I was getting proper humidity.

Second—Travelers. I would see if the travelers needed changing. If travelers are too light or too heavy, it will cause the work to run bad.

Third—Spindles need oiling. I would raise spindles up and oil at top of base. Dry spindles will cause bad work.

Fourth—Improperly adjusted weight levers. Weight levers should be level. If levers rest on board or if they are too high, the ends will come down.

Fifth—Variation in roving. Would give roving immediate attention.

Sixth—Bad rollers. I would have my rollers gone over and all poor ones taken out. Poor rolls cause lots of trouble.

Seventh—Worn out roving sticks. When points of roving sticks get worn flat, it is hard to pull and roving becomes stretched, causing ends to come down. Worn sticks should be taken out and new ones put in.

Eighth—Worn out gears. Gears should be gone over to see if the proper ones are being used and if any are worn. Worn gears should be replaced with new ones.

Ninth—Ring rail too low. See if rail runs too low on bobbins. This causes ends to come down.

Tenth—Top clearers not picked. If they are not picked five or six times a day, they will cause the middle rolls to run wrong, causing ends to run out to side and come down and come through the work.

Eleventh—Poorly kept underclearers. Underclearers should be kept covered and in good shape.

Twelfth—Improper setting of top rolls. These rolls should be set according to staple of cotton to be run. If they are set too wide or too close, work will run bad.

Thirteenth—Dirty fluted rolls. Fluted rolls should be scoured every six months.

Fourteenth—Dirty room. Work should be kept clean and spinners should be required to clean off at certain times. Dirty work will cause bad spinning.

Fifteenth—Speed too high.

Sixteenth—Too much air. Windows should be kept down at the bot-

tom. Too much air drives up humidity and causes trouble.

Seventeenth—Spinning should be overhauled once a year. Always look for the little things. You can easily see the big things that give trouble when it is only the little things that are making all the trouble.

T. B. M.

Number Four

I wish to enter your contest on "Causes of Bad Spinning"—not that I feel sure of winning the prize, but that I may give some other spinners the benefit of my 26 years' experience in the spinning room.

We will take for granted that the roving is fair. (Of course we all know that if the roving is not made right the spinning will run bad.) We will start where the roving is set into the creel of the spinning frame. If the roving skewers are battered on the bottom end, that will cause the roving to run tight, and it will weaken the roving to some extent. Of course if the roving is stretched it will cause a thin place in the roving, and that will cause the end to come down. When the end comes down there is some cause for it coming down. An end on a spinning frame will not come down without some cause. Of course, there are a great many things which will cause the end to come down. I have mentioned one of them above and I am going to mention several more.

The roving trumpet on the roving traverse should be set so the roving will not run too close to the end of the roll. If the roving runs too close to the end of the leather roll, that will cause the end to come down, and at times will run out at the end of the roll.

The back and middle steel rolls should be cleaned at least once a week. If a small roving lap should be on either the back or middle steel roll that will cause the end to come down, and the same thing applies to the leather rolls. Leather rolls should be kept as clean as possible. They should be cleaned every day, and on coarse work the front rolls should be cleaned twice a day. Clean rolls are very important for good running work.

Now we come to the guide wire which, if not set with the roll and the spindle, will cause the end to come down. When I say set with the roll I mean the guide board should be set the right pitch from the roll, so as not to bind too much on the guide wire. If the guide wire becomes worn to where the end stays in one place all the time, that is, if a groove becomes worn in the guide wire it should be filed out and smoothed out so the end will have the entire guide to run in.

Now we come to one of the most important things in the spinning room, which is the traveler. The traveler that runs the best is the traveler to use. My experience with travelers has been to try them all, and the one that runs the best is the traveler to use. Travelers on new rings should be changed about every 60 running hours, and after the ring becomes slicked up the travelers should be changed after they have run 120 hours.

I have never had any experience with a No. 1 flange ring, but some say the No. 1 flange is best, and some say the No. 2 flange is best. As for that part I can't say. I have always used the No. 2, and I have never thought it advisable to change.

Another very important thing is the spindles. The spindles should be plumbed at least once a year, and oftener if necessary, because if the spindles are out of line the ends will be down about half the time.

Spindles should be oiled every two weeks with a good grade of spindle oil, not too heavy, and the oil should be put in the base and not on the spindle rail and on the bands. When too much oil is put on the outside of the base if gets on the band and the band throws it on the ring and the traveler becomes oily and gets too light and the ends begin to come down. The oiler should be careful in oiling spindles and not yet too much oil on the spindle whirl. That will surely cause bad running spinning, for a day or so anyway.

I think a tape drive is best, but where a band drive is used the bands should be tied on tight, for the tighter the band is, the more even the twist will be. A loop knot is much better than the regular flat knot, because when the loop knot is used, you will have no slack bands and no soft yarn, because as soon as the band gets the least bit slack it will fall off.

When the spinners flag an end the section man should try and find out what is the matter with the end, because a spinner is not going to flag the end unless there is something wrong with it. If the roll is bad a new roll should be put in. If there is a roll lap it should be removed, if the guides or spindles are out they should be set; in other words, the section man should fix the end before he leaves it.

Four or five ends on a side that run bad will keep a spinner behind

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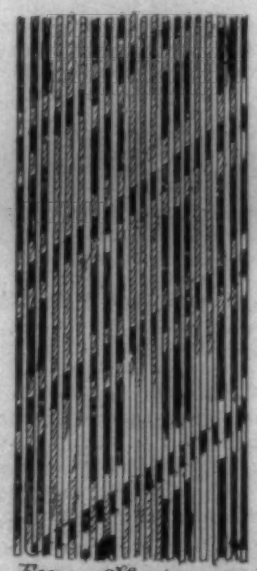
Manufacture of Fancy Goods

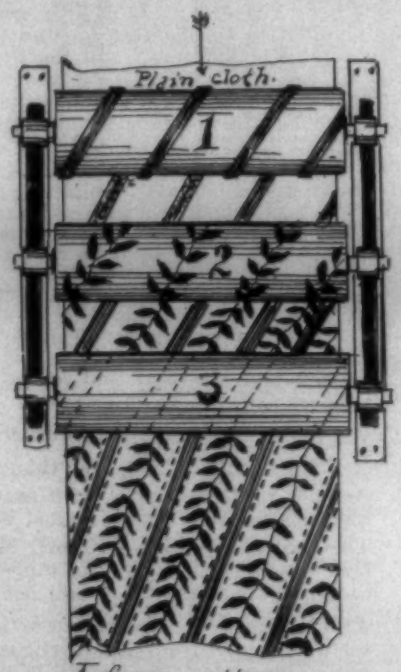
This is the sixth of a series of articles on fancy weaving. The next will appear in an early issue. —Editor.

Other Methods of Manufacture of Fancy Goods Than Weaving.

A cotton mill is not dependent upon its weaving machinery for the production of that class of fancy goods in which the term fancy is applied because of pattern effects produced by printing, staining, painting or otherwise fixing colorful designs on the surface of the fabrics. A fancy weave in which the threads are required to be flushed at times and closely intersected at times in order to produce a fancy effect must be executed on a loom capable of thread manipulation. But the fancy effect which is on the surface of the cloth only, and usually consists of an elaboration of beautiful and brilliant color effects in scrolls, diagonals, angles, imitations of floral designs, stripes, checks, and figures of all kinds is readily produced on cloth woven on the plainest types of cotton looms by one or more of the printing or staining processes. In fact, the field of operations along these lines has been wonderfully developed in recent times, so that one may find colored creations on coton fabrics which have been put there by processes of embossing, filling, enamelling, staining, hand or machine painting, bleaching, and special dyeing methods in addition to the established surface printing operations with the hand blocks, or machine rollers. The hand painting of cotton fabrics for commercial purposes, is of course, too slow and costly, although it is popular on certain individual fabrics for decorative purposes. The hand block system of producing colored patterns on cloth is also quite obsolete in this country where speed and production are essential.



Fancy effects can be woven in a plain loom with printed warp threads.



A fancy pattern produced on plain white cloth by printing cylinders.

But this method of printing is still in use in some of the smaller print mills in foreign countries and occasionally in small mills in this where prints are only a side production of the plant. Cotton printing, silk printing, wool printing and fact nearly all kinds of textile printing have had such an advance in recent years that high speeded rotary presses have supplanted the slower hand methods in the majority of mills engaged in color printing. Some fancy fabrics are made by previously printing the patterns in colors on the yarns, before weaving, in which case the length of the designs on the yarns are extended so that when the yarns are interlaced in the weaving, the take-up will bring the dimensions of the patterns to the normal proportions. The warp threads for this kind of weaving are printed with the pattern by winding them around a large cylinder and coloring them according to the design some of which are shown in the assembled stretches of warp threads in the drawing. When a warp of

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Practical Discussions By Practical Men

Variations and Deviations in Yarn Numbers.

Editor:

What is the difference between the above two terms, viz., variation in numbers and deviation in yarn numbers? Dunno.

Answer to Dunno.

Editor:

Replying to Dunno's question of "what is the difference" between yarn number variation and deviation, is to take up a very interesting matter regarding the testing of yarn numbers, and a question regarding which very little (if any) has been said in textile journals. In order to illustrate the difference, we will take the weights or sizes of No. 60s yarn as found by weighing eight different bobbins, as follows: No. 1, 60.10; No. 2, 60.50; No. 3, 61.00; No. 4, 59.00; No. 5, 58.50; No. 6, 60.00; No. 7, 60.40; No. 8, 60.30. The average number of this assortment of weights is 59.97. The lightest is 61.00. The heaviest is 58.50. The extreme variations between these is 2.50 numbers. This represents an extreme variation of around 4 per cent, but it is not an average variation. It is not possible to get an average variation by taking only the lightest and the heaviest. In order to secure the normal average, we must see how much each size taken deviates from the average number. This is done by subtracting all of the sizes that are heavier than the average number from the average number and also by subtracting the average number from all of the sizes which are lighter than the average number, thus: No. 1, 13 points lighter; No. 2, 53 points lighter; No. 3, 103 points lighter; No. 4, 97 points heavier; No. 5, 147 points heavier; No. 6, 3 points lighter; No. 7, 43 points lighter; No. 8, 33 points lighter.

By adding the deviations of the eight sizings we have a total of 492 points of deviation. By dividing this total by the eight or total bobbins weighed, we have an average deviation of 61.50. Now, if we divide this by the average number of 59.97 we find the percentage of variation to be only a little over one per cent and this is called deviation.

Charleston.

Answer to Weigher.

Editor:

In answer to Weigher regarding the testing of grain scales. This is a very important matter. Grain scales get out of order in time the same as everything else. The little weights usually begin to wear away owing to the constant handling of them. This makes them weigh lighter. This in turn will cause the little skeins of yarn to appear to be too heavy. The work will be run lighter than it should and cause bad running work. Therefore, it is highly important to have the grain scales properly tested out. In a large mill, the best way is to have an extra pair of scales on hand. Once per month the scales in use should be tested out by comparing the weights on the extra pair of correct scales. If there are slightest indications that there is a factor of error, they should be sent to the makers for repairs and to be tested out and corrected. In this way there will always be on hand a correctly tested scale.

Here is another way to test the scales: Get a list of the actual weight in grains and tenths of grain of each weight from the scale makers. Keep this list of weights on file. Once a month weigh each weight to see if they are right.

Again weigh all of the weights together. If they do not weigh the full weight, then weigh each one separately to see which one is wrong.

Still another test can be made.

If you are weighing several test skeins of yarn, weigh each one separately, and then weigh all of them at one time. If the factor of error is unreasonably great, then the scales are out of order.

Notwithstanding that scale weights are more apt to lose weight, sometimes they will rust or become gummed with something which will increase their weight.

To have the grain scales weigh correctly is of vital importance. The improper variation of 1-10 of a grain in any mill may involve the loss of thousands of dollars per year. Many mills need to have their grain scales tested. Be sure that the pivot pit is kept clean.

Charleston.

CAUSES OF BAD RUNNING SPINNING

Up to Tuesday night of this week forty-eight articles had been contributed to the contest for the best practical article upon "The Causes of Bad Spinning" and the first four of these articles appear in this issue.

With the card room running well, but not necessarily producing good roving, the spinning room is running badly.

Maybe it is caused by defective work in the card room that does not show up until the spinning is reached or maybe it is due to defective adjustments or equipment in the spinning room.

We want the experience of practical men because the things that they have done to overcome bad spinning should be recorded for the benefit of the young men who are now learning to run spinning rooms.

As many of the best practical men not write or spell well, we will undertake to put their articles in shape. We want practical ideas and hope that no one will refrain from entering this contest because of lack of education.

Remember, however, that no article mailed later than May 15th will be considered in the contest.

Contest Rules.

1. Articles must not be longer than three full columns.
2. Articles must be signed with assumed names but the real name and address of the writer must be known to us.
3. The subject, CAUSES OF BAD SPINNING, will include anything that has a bearing upon the subject. It is to be assumed that the card room is running well but not necessarily making good roving.
4. Articles must be original and articles that include paragraphs or sections copied from other articles on this subject will be thrown out. The contestants and all of our readers will be requested to call our attention to any articles that show evidence of having been copied.
5. Articles will be published by us in the order received and the judges will be instructed that where two are of equal merit the decision shall be given to the one received first. It is therefore advisable to mail articles as early as possible.
6. In mentioning machinery the name of the maker can not be given. This rule will not apply to special machinery or attachments that have no competitors.
7. Articles which are received after May 15, 1926, will not be considered in the contest.
8. The contest will be decided by seven practical men who, acting independently of each other, will read the articles and give us their opinion relative to which is the best and second best. A vote for first place will count one (1) and a vote for second place will count one-half (½).
9. The article receiving the largest number of the judges' votes will be declared the winner and its writer will receive $25.00. The writer of the article which receives the second largest vote will receive $15.00, and of the third best, $10.00.

The writer of the best practical article contributed to this contest will receive $25.

The second prize will be $15 and the third prize $10.

Answer to Yarn.

Editor:

In response to yarn regarding the excess of deviation of yarn strength over and above yarn sizes, will say that it is because there are more things to interfere with yarn strength than there are things to interfere with yarn sizes.

That is yarn size is more easily controlled than yarn strength.

Just one illustration will prove this: Let us take for example a yarn that is full of thick and thin places. It may average very near the yarn number, but it will be away off in strength. Why? Because the thick places even up and average up the thin places so far as weight or yarn size is concerned. But every thin place in the yarn is a damaging point or breaking point for the strength.

Let us suppose that there is one thin place in each three inches of yarn. Then in 120 yards of the yarn tested for strength, there will be 1,440 breaking points. But none of these breaking points will interfere much with the yarn average number. It will be the same way with uneven yarn. The thin or lean yarn will serve to thin out the heavy stretches of yarn, and thus the yarn size will average up in size or number, but not so with the strength of this yarn. Illustrating our point again, let us suppose that in the 120 yards of yarn tested and broken for strength, that there are three stretches of uneven yarn. Then there will be three places to interfere with the yarn strength to no places to interfere with the size of the yarn if these three are thin.

On the average, the strength of yarn will have twice to three times as much variation and deviation as the yarn sizes will have.

H. D. M.

Southern People Should Be Loyal to the South's Greatest Product

(Belton News)

Cotton farmers and cotton goods manufacturers are greatly embarrassed at present, due to the fact that the price offered for cotton and cotton goods is below cost to produce. No industry can exist under such circumstances. Something must be done to relieve this situation. As long as the supply is greater than the demand, this condition will continue to exist. We Southern people are not loyal to our greatest product. Our farmers produce cotton, the mill operatives manufacture cotton cloth, but neither of them use it to much extent. If we do not use the goods we produce,

we can't expect other people to use them. It reminds me of the man looking for his spectacles, when they were already on his nose, and he was looking through them. We are looking through the opportunities that are right before our eyes, trying to find a market elsewhere for our goods. Let us, one and all, ask ourselves the question; why do I not wear more cotton goods? Each one of us should be a customer and a booster for cotton goods.

During the summer we can use cotton clothing exclusively. Cotton makes real good shoes and hats. Style? Why anything that everybody wears is style, so lets all wear cotton. There is not a business man, or a laboring man, that could not join a cotton clothing club. We eat our farm produce, why not wear it, and be independent, girls? Why I have never seen a girl dressed in anything prettier than a beautiful white coton dress. Just think of the increase in the buying by the farmers, because if he can sell his product at a profit, he can in turn buy from the merchant. The merchant buys from the manufacturer, and it all helps to keep business stimulated. When we Southern people cooperate fully with the South's greatest industries; namely, cotton raising and manufacturing of cotton goods, by using the products of these industries, we will see a more prosperous South than ever before.

It is important that the mills begin at once to make a special study of the demand that can be created at home, by making attractive patterns of dress goods, and getting them before the people. Let the people know that something can be made from cotton besides the ordinary everyday goods. If we use all the care in finishing cotton goods, that is used in finishing some other classes of goods, we will be surprised at the results, and would in a very short time be dressed from head to foot in cotton clothing.

So let's get together, farmer, mill man, banker and laborer, and prove to the world that we realize the value of our most valuable product "Cotton" by using it ourselves. Then we will not have so much to export and can demand a better price for it.

C. H. STRICTLAND,
Supt. Belton Cotton Mills.

Thomaston Mills Land Big Order

Cord tire fabric to the extent of 100,000,000 pounds will be produced for the B. F. Goodrich Co., and the Fisk Rubber Co., by the group of mills centered about Thomaston, Ga., and controlled by the R. E. Hightower, Sr., interests, according to announcement by R. E. Hightower, head of the mills. A contract to this effect is understood to have been closed last week, after a series of conferences held in New York.

According to the announcement this tremendous yardage makes mill expansion in the Thomaston district imperative. An agreement has been reached, it is said, between the Fisk Rubber Co. and the Hightower interests, as the result of which 35,000 spindles will be installed at Thomaston, as soon as provisions can be made for housing them.

The mill properties at Thomaston controlled by the Hightower interests are the Aldora Mills, Peerless Cotton Mills, and Thomaston Cotton Mills, capitalized respectively at $400,000, $1,700,000, and $3,000,000.

The Aldora Mills produce cord tire fabrics, having 6 cards, 12 broad looms, 13,824 ring, and 5,184 spindles. Four hundred operatives are employed.

The Peerless Mills have been producing sheets and pillowcases, having 150 cards, 620 broad looms, and 25,000 ring spindles.

The Thomaston Cotton Mills, the largest of the group, of which, as of the Peerless, W. H. Hightower, Sr., is president, has been making duck and drills, as well as tire fabric. The equipment includes 270 cards, 500 broad looms, 75,000 ring and 4,000 twist spindles.

The Aldora Mills have been selling direct, the Peerless through Converse & Co., and the Thomaston, through Brander & Curry.

The spindles will be shipped down from Passaic, and are now in the Essex Mills, formerly operated jointly by the Goodrich company and the Fisk Rubber Co., it was said. The spindles belonging to the Goodrich company already have been shipped South for installation, and there are said to be approximately 35,000 spindles belonging to the Fisk company in the Essex plant, which can be utilized. That means about 350 addition operatives will be needed, when work begins.

The deal was handled through L. W. Roberts, textile engineer of Atlanta, and is said to be the biggest order ever placed for textiles.

Curtailment News

Inman, S. C.—The curtailment program of the Inman Mills here will amount to two days per week, it was announced today by J. A. Chapman, superintendent. The mills will close down Friday and Saturday of each week until further notice.

Cateechee, S. C.—The Norris Cotton Mills Co., have posted notices that they will be closed on the 7th and 8th of May, and on each succeeding Friday and Saturday until further notice. This schedule will, when effective, reduce weekly production about 25 per cent.

Gaffney, S. C.—Notices were posted last week at the mills of the Hamrick chain that a curtailment schedule amounting to 25 per cent will be put into effect within two weeks' time. The mills will close down each Thursday night and remain closed until the following Monday, this schedule to last indfinitely.

Greenwood, S. C.—Notices have been posted by five cotton mills here that, beginning May 8, a curtailment program will be effective until further notice. According to the announcement, the mills will be shut down Friday and Saturday of each week. The Greenwood Mill, Grendel No. 1, Grendel No. 2, Panola Mills and "Ninety-Six" Mill are the plants adopting the curtailment program.

Visiting the Mills

(By David Clark)

WHEN attending the Foreign Trade Conference at Charles'on, S. C., on April 28th, 29th and 30th. I drove my car to Florence, S. C., and went from there to Charleston, S. C., by train in order that I might visit some mills while returning.

I left Charleston on Thursday afternoon at 4 o'clock and reached Florence about 7 p. m. and was soon on my way in my car. There is a hard surface road from Florence to Darlington, one of the few in that section and for about ten miles it felt like I was back in North Carolina.

If the Darlington Manufacturing Company had been operating at night, it was my intention to pay C. L. Gilbert a visit, but while I regretted to miss seeing him I was very glad to find one mill that was not on night operation.

I drove from Darlington to Society Hill and from there to Bennettsville where I arrived about 8:30 o'clock. Phil Gwaltney, general superintendent of the Marlboro Mills, at McColl had wired me, to spend the night at his home but thinking that I would reach McColl very late I declined the invitation.

After registering at the hotel in Bennettsville I phoned O. L. Derrick, supérintendent of Marlboro Mill No. 5, which is located in Bennettsville and he came to the ho'el and spent an hour or more with me.

I have known Mr. Derrick for many years while he was superintendent at Rock Hill and other points. The first time I ever saw him was when he was one of the outstanding football players at Clemson College. In those days he was regarded as one of the best players in the Sou'h and Clemson had a winning team.

At his mill in Bennettsville he makes 23's and 13's yarns for tire cords. They are shipped on section beams by truck to Mill No. 6 at McColl where they are twisted and woven.

Early Friday Morning I drove to McColl and found Phil Gwaltney in his office. The president, Chas. Iceman returned that morning from New York but did not ge' to the office before I left. I did however, meet the secretary, F. F. Adams.

The Marlboro Mills are composed of five mills in McColl, some of which are widely separated and one mill in Bennetsville. They have 46,000 spindles and in addition to tire cord and make carded hosiery yarns and fine combed yarns.

We first visited Mill No. 1 and 2 which are in charge of Alexander H. Hamilton. Much of the machinery in these mills is twenty-five or more years old but they were running well and appeared to be kept unusually clean.

From Mill No. 1 and No. 2, we went across the railroad to No. 6, which is the tire cord mill. In addition to the cord looms there are many twisters which twist from section beams.

We also visited the testing room which is a necessary adjunct to every tire mill and watched them test the yarns. It appears that almost every tire manufacturer has different specifications on breaking strength and stretch and different methods of making the tests. Jaws that are suitable for breaking the yarns for tire cords for one tire manufacturer sometimes cannot be used for another.

I often wonder why mills put up with the whims of the tire manufacturers when there is such a small margin of profit in the manufacture of tire fabrics and cords.

I found Mill No. 6 to be in charge of Fred Campbell who had been recently promo'ed to superintendent. He was originally with the Bibb Manufacturing Company and evidently knows his business for his mill was running well.

Mill No. 3 which adjoins No. 6 was a yarn mill that makes tire cord yarns. It was recently put in charge of G. A. Hales who had been master mechanic for many years. Phil Gwaltney said that if he made as good a superintendent as he had a master mechanic he would have to go some.

In No. 3, they had just ins'alled a new H. & B. American Machine Co. opener and breaker picker equipped with bale breaker and a 40-inch upstroke Buckley opener. It also had their patented evener motion.

The H. & B. American Machine Co., is very proud of this lapper and according to Phil Gwaltney it was doing all they claimed for it.

Knowing that I had a long trip ahead of me I wanted to leave early but Phil Gwaltney insisted that I had to see Mill No. 4 which was on the other side of town and the visit was worth while for I found an unusually well equipped and good running mill on combed 60's and 70's.

Mill No. 4 which is known as the Iceman Mill was built by Chas. Iceman during his former connection with the Marlboro Mills and Chas. Iceman who is considered to be one of the most expert yarn manufacturers in the South, knows how to build and equip a mill.

This mill is in charge of J. G. Bennett who came a few years ago from New Bedford, Mass. Mr. Bennett is said to be a crank on the subject of regulated humidity and judging by the operation of his mill I wish there were more like him.

It is our observation from frequent visits to mills that superintendents lose more from lack of attention to humidity than from anything else.

Leaving McColl about 10 o'clock I drove to Cheraw and first called at the Cheraw Spinning Mill which is now a part of the Cheraw Cotton Mills.

A boy at the door informed me that superintendent J. L. Fonville was at the other mill but if I had recalled then that J. A. Johnson was in charge of that mill I would have paid him a visit.

I drove to the Cheraw Cotton Mill which is located some distance from the center of the city only to find that Mr. Fonville had just left and I therefore did not have the pleasure of seeing him.

I was very much interested in seeing the River Hill Spinning Co., which makes coarse yarns upon the Whitin waste system.

The superintendent R. W. Hollis who was formerly with the Cheraw Cotton Mills, but originally from

(Continued on Page 30)

Morgan Takes Issue With David Clark

(Greenville News)

The News has just received copy of a letter written by Clinton J. Morgan, local textile executive to David Clark, Charlotte, editor of the Southern Textile Bulletin. Mr. Morgan takes Mr. Clark mildly to task for a recent statement that South Carolina cotton mills which happen to have plenty of orders ahead should cooperate with less fortunate one by curtailing and thus bringing the market more quickly back to a normal condition. He considers that if a mill nas contracts made that it should run straight ahead and fill these, which have been made in good faith, rather than cancel them on the basis of coperation with mills not having work ahead.

Mr. Morgan's letter follows:

Mr. David Clark, Editor
Southern Textile Bulletin,
Charlotte, N. C.

Sir:

The Greenville News as of April 25th quoted you in part as follows:

"An outstanding fact that one of the milestones in the development of cotton manufacturing in the South is that fine yarn mills in Gaston county, which are **fully supplied with orders**, are doing their bit by curtailing equally with the fine yarn mills that are short of orders.

"It shows a splendid spirit of cooperation and marks the passing of the idea of every man for himself.'

"By **joining with the others** they have insured curtailment without which, in a short time, they would have felt the weight of accumulated yarns.

"If the weaving mills in South Carolina that have ample orders for full time operation will curtail equally with less fortunate mills, we can, indeed, say that a new day has dawned and that the future prosperity of industry is assured."

The writer on April 20th made the following statement to a newspaper reported: "If and when it becomes necessary, in order to protect the interest of the shareholders, the American Spinning Company will curtail. This company has many orders ahead which must be filled. The same holds true with the Virginia Manufacturing Company."

This statement, which was given wide circulation, was attributed to Mr. Jas. H. Morgan, who was absent from the city.

I do not consider contracts which were entered into prior to over-production, or underconsumption, of textile fabrics "mere scraps of paper" and I feel that we are both legally and morally bound to fulfill such contracts. I am also of the opinion that executive officers have no right to jeopardize the interests of the shareholders in textile plants by cancelling or refusing to deliver goods which were contracted for in good faith.

I do not feel warranted in preventing our employes from working, and thereby reduce purchasing power, as long as we have bona fide orders upon which to operate the mills.

I am very much impressed with the sentence which reads "By **joining** with the others they have insured curtailment, etc." The writer has always been under the impression that there is a federal statute, and possibly State laws as well, which prohibit the joining with others for the purpose of reducing production of any commodity which is manufactured. It is exceedingly gratifying to learn that I am in error in so thinking, and that individual curtailment is not the only method whereby excess production can be eliminated.

I do not consider that it is fair or just for you to assume without investigation that the weaving mills in South Carolina lack a spirit of cooperation because they do not suddenly close their mills, cancel contracts and jeopardize the interest of shareholders and employes and a reputation for prompt deliveries, regardless of consequences, in order to assist "less fortunate mills."

I appreciate fully, as well as others who have given the subject any thought, that when there is overproduction or underconsumption of textiles that the only relief is curtailment. This was clearly illustrated last year, when through an act of Providence the mills of necessity closed. In May 1925, prior to curtailment, New York spots were quoted at 24.60 and 20's yarns were selling at 40 cents; in September New York spots were quoted 24.80 and 20's yarns were selling at 45c, or better.

If you desire to effect a permanent improvement, why not advocate, provided it is legal to do so, a complete cessation of night operation. The replacement value of property and houses for night operation for the average mill of 50,000 spindles will not exceed $100,000; which is to a certain extent a nominal investment as compared with the entire cost of the property. If the pressure of production is permanently relieved by elimination of night operation this investment in property and houses should be absorbed by the enhanced value of goods.

The operatives who work at night can be directed within a reasonable length of time to some other occupation; as the uncertainites of textile manufacturing should, at least theoretically, be largely eliminated.

The writer happens to be operating a yarn mill at night as well as day, for the very simple reason that

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Cotton Mill Processes and Calculations

By D. A. Tompkins.

Copy Revised for Third Edition.

(Continued from April 22nd)

372. Fig. 61 shows the detail of this measuring motion. A is the driving shaft carrying a worm B which turns the gear C. Gear C is on a shaft carrying a gear E on its other end which drives the gear G and wheel H. This wheel carries a pin, which rings the bell at each revolution. All of these gears are changeable, so that a wide variation may be made in the speed of the wheel H. The measuring roll K, Fig. 60, is driven from main shaft by sprocket wheels with 30 and 10 teeth, so that measuring roll runs 1-3 the speed of main shaft. If measuring roll is 24 inches in circumference, it will deliver 8 inches for every revolution of main shaft.

373. To simplify the calculations, we shall treat the main shaft in Fig. 61 as a roll of 8 inches circumference. Consider the wheel H as the driver, and use the largest gears marked in Fig. 61. The number of yards delivered for one revolution of H will be given by the formula:

$$\frac{86 \times 86 \times 8}{35 \times 1 \times 36}$$

This works out 47. Any of the gears may be changed to alter this length, but for the sake of uniformity with the other formulas, we will consider the gear E as the change gear for ordinary purposes. This gear (35) is in the denominator of above formula, and hence if we leave it out, the result will be

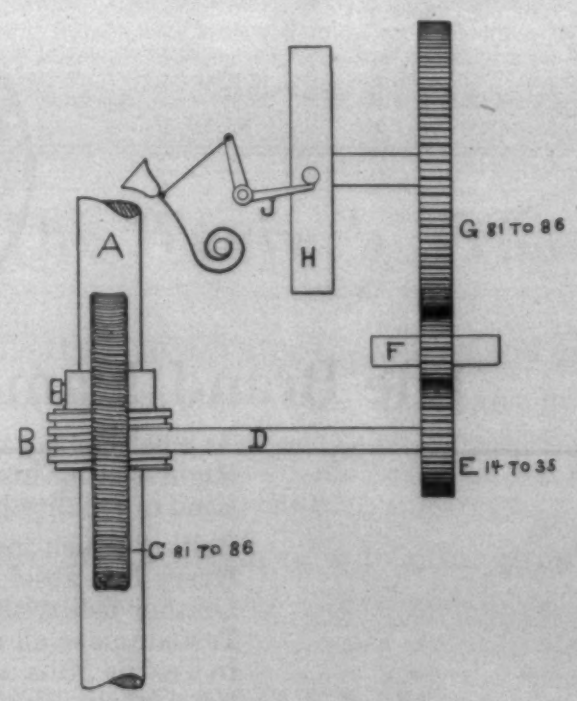

Fig. 61. Measuring Motion.

the constant for the machine instead of the number of yards as above. This would be:

$$\frac{86 \times 86 \times 8}{- \times 1 \times 36}$$

and works out 1643.6. This constant divided by any number

of yards required, gives the gear to use at E. If 70 yards are required, the gear would be (1643.6÷70=) about 23.

ELECTRIC STOP MOTION.

374. The Denn warper should always be equipped with an electric stop motion, similar to the one described in connection with the beam warper (203) with the addition of an annunciator which indicates the particular thread that is broken. As there are 2,000 to 3,000 spools in the creel, this addition saves time in finding and piecing up broken ends.

BALL WARP ATTACHMENT.

375. A Denn warper may have an attachment for delivering ball warps. As the bundle of yarn emerges from the calender roll, instead of going to the linker, it is wound on a wooden roll running in bearings on the floor in front of the linker. The yarn is guided on this roll by a traversing eye, which causes the yarn to cross and recross, and wind in a hard cylinder. It is covered with gunny cloth, and shipped, with the wooden roll inside.

Chain warps are sometimes shipped loose in sacks, but are mostly baled.

376. Chain warps are sold nominally by the pound; but on account of the rigid limitations in the counts demanded by the trade, it amounts to selling by the yard. For example, a mill receives an order for a warp 1224 yards long, with 2,000 ends of number 24 single yarn. Theoretically, the weight of this yarn would be expressed by the formula:

$$\frac{1224 \times 2000}{840 \times 24} = 121$$

But in practice it may, on account of variation in yarn, weigh 140 pounds. In this case the mill receives pay for only 121 pounds, the theoretical weight. On the other hand, if the yarn is spun too fine, and the warp weighs only 100 pounds, it is apt to be rejected entirely. A variation of more than 5 per cent. is not generally satisfactory. Hence great care is necessary in spinning yarn for Denn warps.

GENERAL DATA.

377. A Denn warper with creel for 2,000 spools occupies a space about 18 feet wide by 35 feet long.

Pulleys are about 12 x 2 and run 150 to 200 revolutions per minute.

This delivers about 33 to 44 yards per minute.

It requires about half a day for one hand to creel 2,000 spools, and about a day to run them into the warps. For spools holding 1 pound of yarn, the production would therefore be about 2,000 pounds in a day and a half, or say 1,300 pounds per day. The time lost in creeling may be reduced by employing two hands for that part of the work. Only one hand is required for the other work.

Yarn put up on Denn warper is generally known as "warps," while yarn from a reel is known as "skeins."

378. There are two kinds of links made in chain warp: the single link and the double link. The latter is considered better.

There may be double head machines as well as single head. The double head machine has two creels and two linkers, and has about 50 per cent. greater capacity than the single head machine. It would have double the capacity, except for the

(Continued on Page 32)

SOUTHERN
TEXTILE BULLETIN

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D. H. HILL, JR. — *Associate Editor*
JUNIUS M. SMITH — *Business Manager*

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Reduced Acreage

FROM a carefuly study of the situation and from reports received from almost every section of the South, we wish to go on record as predicting that more than 2,000,000 less acres will be planted in cotton this year than last, and we would not be surprised to see the reduction reach 3,000,000 acres.

We know that our opinion is not in accord with others, but we will let time determine whether or not we are correct.

The comparatively high price of cotton and wheat has played some part in the reduction but the chief factor has been the delay in crop preparation which has caused many farmers to abandon areas that they contemplated planting.

Most of those who made predictions at this time last year underestimated the acreage by 3,000,000 acres and it is our opinion that this year they are overestimating.

With a reduction of 2,000,000 acres it is still possible to raise too much cotton, and we are making no predictions relative to the yield or price.

Curtailment

OUR suggestion that mills with orders should join in the curtailment program in South Carolina was not received with unanimous approval.

Some mills claim that they can not curtail because they would violate contracts for the delivery of goods and there are, no doubt, a few mills with which such is the case but in most instances it would be a comparatively simple matter, if desired, to arrange for such extension of deliveries as to permit joining the curtailment movement.

We are surprised to learn that some have fallen back upon "duty to stockholders" requiring them to continue in operation.

It is a well known fact that there is a very slight margin of profit, if any, at present prices and that, should there be no curtailment, prices will go considerably below cost.

The prevention of an accumulations of goods, by a general curtailment, will save the mills from a period of loss and it appears to us that if there is any "duty to stockholders" it consists of cooperating in any movement that will tend towards a return of profits and prosperity.

We have the idea that if the stockholders had a chance to vote they would overwhelmingly approve the idea of curtailment.

We are at a critical point in the history of the textile industry of the South and this is no time for one mill to take advantage of another or to play to the grandstand.

While we regret to differ with some of our friends, we see general curtailment as the only way to prevent disaster, and although our position may not be unanimously approved, we believe that we are working for the best interests of the industry.

The president of a large South Carolina will who had just returned from New York said to us over long distance phone:

"Some mills who claimed at the Spartanburg Conference that they could not curtail because their entire output was sold ahead for some time, have within the past week sold goods at bottom prices for prompt delivery."

We were not at the Spartanburg conference but have no doubt that most of the mills that claimed to be sold ahead actually had the orders, but the mill president above mentioned states that he has absolute proof that one mill that made such statements was in position to sell goods last week for prompt delivery and did so at prices that would not be acceptable to most mills.

While our mills are discussing whether or not they will cooperate to the extent of curtailing, the English mills which long ago accepted cooperative curtailment as a sound business proposition are now seriously discussing the proposed "Pratt Scheme of Control" under which not only would curtailment but prices be regulated.

In the future we will look back upon this period and be surprised that anyone opposed cooperative curtailment.

There has, of course, been no agreement to curtail and there will be none. The situation was, at Spartanburg, laid before the mills and their selling agents and common sense demanded action by the individual mills.

The South's Loyalty To Cotton

ELSEWHERE in this issue we are reprinting from the Belton (S. C.) News an appeal by C. H. Strickland, superintendent of the Belton Cotton Mills, for greater loyalty for the South's greatest product.

We have always advocated a fair price for cotton because the prosperity of the South depends to a large extent upon the prosperity of the cotton farmers.

There are many indications, but no certainty of lower prices, but we do not believe that even at present prices the farmers will receive an adequate return for their labor.

The Foreign Trade Conference

WE attended the Foreign Trade Conference at Charleston, S. C., but there were so few cotton manufacturers present, in fact, so few people that we knew, that we had a rather lonesome time.

We were much impressed with the type of men present, for they were undoubtedly far above the average and included many of the really big men of this country and Canada.

The addresses were usually fine and gave much information about business and trade conditions throughout the world.

The only thing that fell flat was the banquet on Thursday night. We did not think anybody had worse banquets than the American Cotton Manufacturers' Association, but we believe that of the Foreign Trade Conference went beyond them. After listening all day to excellent but heavy addresses the delegates went to the banquet expecting some enjoyment, but a man talked for an hour about India with a full complement of statistics. There were a few left in the room when he finally concluded.

Aside from the banquet it was a wonderful meeting and we regret exceedingly that there was not a larger attendance of cotton manufacturers.

We need export trade and need it very badly, and yet because of some unfortunate experiences during the 1920 crash, neither the cotton mills nor their selling agentss are making serious efforts to secure foreign business.

The Foreign Trade Conference at Charleston, S. C., gave us a new idea of the possibilities.

Evolution Settled

A CONSIDERABLE agitation seems to have been started in North Carolina over the question of prohibiting the teaching of evolution in public schools and colleges.

The question of evolution was very well settled recently by a negro church in Alabama when, after debating the subject for many hours, the congregation unanimously passed the following resolution:

"Resolved, That God made niggers and that them white folks what thinks they is descended from monkeys, is."

Anybody that wants to believe in evolution has a perfect right to do so and he has and should have the right to proclaim his ideas through the press or in speech, or to teach his doctrine in private schools if he is connected with them.

The matter of allowing a teacher in a school or college to teach evolution is more a matter of public policy than of evolution.

The people who support the public schools through taxes have a right by majority vote or opinion to say what shall or shall not be taught in such schools.

One teacher was years ago driven out of a North Carolina school because she taught that there should be intermarriage between whites and blacks.

The evolutionists contend, in effect, that she should have been allowed to teach that doctrine without interference.

Without discussing evolution we stand solidly upon the proposition that the people have a right to say what shall or shall not be taught their children.

The Alabama negroes said "them white folks what thinks they is descended from monkeys, is," and we will not dispute that conclusion.

England's Crisis

ENGLAND faces a crisis today that may prove exceedingly serious not only to that country but to the world.

Ruthless labor unions have their hands at her throat and will willingly crush England if their demands are not granted.

Englishmen boast of the freedom of their country, meaning the freedom that is rightfully theirs under their plan of government, but labor unions rule England and they have absolutely no consideration for the rights of others.

It was because labor unionism as now constituted and controlled is so absolutely unfair and unmindful of the right of others, that we fought so hard against their establishment in the textile industry of the South.

England faces a desperate situation and one that may effect the whole world.

Personal News

Fred Campbell has been promoted to superintendent of Marlboro Mill No. 6, McColl, S. C.

Alex H. Hamilton has become superintendent of Mill No. 1 and 2 at McColl, S. C.

J. F. Lockey has resigned as superintendent of the Liberty Mills, Clayton, S. C.

O. F. Lefler has resigned as master mechanic at the Franklin Mills, Concord, N. C.

Martin Foil has accepted a position in the office of the Franklin Cotton Mills, Concord, N. C.

T. L. Ayers has resigned as overseer of carding at the Appleton Mills, Anderson, S. C.

F. E. Lathem has become overseer of carding at the Victoria Mills, Rock Hill, S. C.

J. C. Gillipsie has resigned as master mechanic at the Easley Mills No. 3, Liberty, S. C.

R. C. Crumpton, of Greenville, S. C., is now overseer of carding at the Easley Mill No. 3, Liberty, S. C.

F. A. Gossett, of Greenville, S. C., has become overseer of spinning at the Easley Mill No. 3, Liberty, S. C.

Ira Avans has been promoted from night superintendent to day superintendent of the Richmond Hosiery Mills, Rossville, G.

E. G. Waits, formerly superintendent of the Joanna Mills, Goldville, S. C., has become overseer of carding at the Appleton Mills, Anderson, S. C.

A. C. Alexander has been elected president of the Alexander Manufacturing Company, Forest City, N. C., succeeding his brother the late J. F. Alexander.

H. D. Smith has resigned as night overseer of cloth room at the Ninety-Six, S. C., to become day overseer of cloth room at the Elberton Cotton Mills, Elberton, Ga.

Ralph H. Higgins has resigned as overseer spinning at the Cascade Mills, Mooresville, N. C., and accepted a similar position at the Pomona Mills, Greensboro, N. C.

—. —. Green has resigned as master mechanic at the Locke Mills, Concord, N. C., and accepted a similar position the the Franklin Cotton Mills, of the same place.

A. C. Atkinson, superintendent of the Clayton Cotton Mills, Clayton, S. C., has also been appointed superintendent of the Liberty Mills of the same place.

J. W. Jolly, formerly superintendent of the Montgomery Cotton Manufacturing Company, Montgomery, Ala., has accepted a similar position at the Knoxville Cotton Mills, Knoxville, Tenn.

Fred Wright ,of McColl, S. C., has accepted the position of overseer of weaving at the Southern Brighton Mills, Shannon, Ga.

G. A. Hales, who has for a number of years served the Marlboro Mills, McColl, S. C., as master mechanic has been promoted to superintendent of Mill No. 3.

N. B. Arrington, son of John W. Arrington, president of the Union Bleachery, Greenville, S. C., has accepted a position with the Greenville office of the Corn Products Refining Company. He succeeds Harold Van Zandt, who will enter another line of business in New Jersey.

O. R. S. Pool has resigned as Southern representative of the Fafnir Bearing Company, and is now with the James McGraw Company, of Richmond, Va. The latter concern, which has been in business for 60 years handles a full line of mill, mine and contractors supplies and machine tools. Mr. Pool will have the South Carolina territory and specialize in transmission equipment and contractors supplies.

Dr. Jessee F. Cleveland

Spartanburg, S. C.—Dr. Jesse F. Cleveland, 79, veteran of the Civil War and builder and president of several of the largest cotton mills in the Piedmont section of South Carolina, died here Tuesday night after 10 days' illness. He abandoned his medical profession in 1884 to devote his time and attention to the textile industry. He was director in six mills and stockholder in more than a dozen.

Dr. Cleveland became president of Tucapau Mill in 1896 (a short time after the plant was completed, and continued as active head of the company until it was sold in 1923 to the New England Southern Corporation, a Lockwood, Greene & Co. enterprise.

David Clark Will Address Carolina Cooperative Council.

David Clark will leave Wednesday night for Spray, N. C., where on Wednesday night he will deliver an address before the Carolina Cooperative Council of the Carolina Cotton and Woolen Mills. He will also visit the cotton mills in and around Spray.

Spinners' Meeting at Goldsboro.

The meeting of the Eastern North Carolina Section of the Spinners' Division of the Southern Textile Association will be held at Goldsboro, N. C., and not Kinston, as was erroneously stated last week. The meeting will be held May 14, the first session to be called to order at 10 a. m. at the Chamber of Commerce.

C. M. Black, superintendent of the Borden Manufacturing Company, Goldsboro, will act as chairman.

MILL NEWS ITEMS OF INTEREST

Spruce Pines, N. C.—The Chamber of Commerce is interested in a plan to build a textile mill here.

Rosemary, N. C.—The Hunter Manufacturing & Commission Co., has been appointed selling agents for the Patterson Mills Co., Inc.

Lincolnton, N. C.—The Boger and Crawford Spinning Company, has let contract to Michael & Biven, Gastonia, for wiring the new plant addition now under way.

Buffalo, S. C.—Fire which broke out in the picker room of the Union-Buffalo Mills did damage estimated at around $5,000. Most of the damage was done to the stock.

Florence, Ala. — Local business men have received a proposition from a knitting mill in New York State relative to moving its plant here. The company offers to come here if local interests will subscribe $75,000 in stock and furnish a building to house the mill. The company proposes to install a knitting plant worth $145,000.

Granite Falls, N. C.—The new mill being built here by the A. A. Shuford interests will be known as the Allred Mills, in honor of J. M. Allred, superintendent, who has been connected with the company for over 30 years. The building, which will be 100x400 feet, has been completed and the machinery is now being installed.

Marshville, N. C.—The Marshville Cotton Mills, Inc., has been incorporated to operate the Marshville Cotton Mills of this place. The mill has been operated under lease for some time by the Morgan interests of Laurel Hill. Edwin Morgan is one of the incorporators of the new company, B. C. Parker, E. E. Marsh and B. C. Parer being the other incorporators.

Gadsden, Ala.—The Gadsden City Council has exempted the Sauquoit Spinning Company, of Alabama, from the payment of all city taxes and licenses for a period of five years with the exception of school taxes and assestments for street improvements. This action was taken by adoption of a resolution and it is a promise that is made to induce other factories and industries to locate here.

Kingsport, Tenn.—It is understood that the Holliston Mills, Norwood, Mass., will establish a plant here for the manufacture of book cloth, the mill to have a yearly capacity of 10,000,000. The plans include the erection of a bleachery. The entire plant is planned as two connecting buildings 540x70 feet. The Holliston Company is not to move its spinning and weaving plant at Norwood, but to establish the finishing and bleaching plant.

Thomaston, Ga.—R. E. Hightower, Sr., head of the Peerless and Thomaston Mills, here and the Aldora Mills, Barnesville, has completed arrangements with the B. F. Goodrich Company, and the Fisk Rubber Company, of Akron for handling an order of one hundred millions dollars worth of tire fabric. In addition, the Hightower interests and the two tire companies have announced that they have formed a partnership to erect a mill of 35,000 spindles and necessary looms to produce tire fabric, the new plant to be located near this place.

It is also understand that the Thomaston Mills will install an additional 10,000 spindles.

Honea Path, S. C.—The Chiquola Manufacturing Company is now prepared to meet a power shortage in case of another drouth, approximately $75,000 having been spent to enlarge its steam plant and to equip it with new water tube boilers. The new equipment will be ready for operation soon.

The severe drouth of last summer made it necessary for the Chiquola plant, as well as other textile plants in South Carolina curtail operations, a general water power shortage being prevalent.

Several other textile plants in the Piedmont section have installed larger and more efficient steam plants to obviate curtailment in case of another drouth.

LaGrange, Ga.—The Unity Spinning Mills plan to erect a plant for the manufacture of coarse yarns. The building will be 132x217 feet. They will also build six warehouses, an opening room and a number of cottages for the operatives.

Lincolnton, N. C.—The machinery to be installed in the Roseland Spinning Company, as noted, will include 2,000 twisting spindles, reels and winders. An addition, 32x82 feet is being built and the plant changed to the electric drive.

Charlotte, N. C.—Recent sale of motors by Fairbanks, Morse & Co., include motors for the Sunset and Canebrake plants of the California Cotton Mills, at Selma and Uniontown, Ala., and the Mill No. 2 of the Carolina Textile Corp., at Dillon, S. C.

Salisbury, N. C.—The F. A. Tomalino Silk Dye Works, of Germantown, Pa., which recently purchased a site here as noted, will at once begin building a dye plant here. It will be known as the Southern Silk Dye Works and will be ready for operation in August. The equipment will include a department for winding, coning and converting yarn. F. A. Tomalino will be in charge.

Nashville, Tenn.—Thomas Henry & Sons, of Trenton Ave., Philadelphia, will remove its mill from that city to West Nashville. The company has a site of 15 acres and will equip the mill here witth 20,000 spindles and 134 looms for making turkish towels. Robert & Co., Atlanta, are the engineers. Marr and Holman, of this city are supervising architects and Rock City Consturction Company, of Nashville, have the building contract. The mill is to cost $125,000.

Greenville, S. C.—Directors of the Southern Worsted Corporation of tthis city, will meet here on May 27 to consider the question of increasing the capital stock of the company from $1,200,000 to not more than $1,400,000 according to information given out here. Other questions of importance will be considered by the directors ats the same time.

No extension of the plant is contemplated, it was stated by B. E. Geer, president, the proposed increase of the capital stock, if made, being to care for expansions which have already taken place.

Greenville, S. C.—Possibility of Greenville securing a new cotton mill, to be constructed by Gus Jordan, manufacturer of West Palm Beach, Fla., came to the surface here recently.

Mr. Jordan was here last week and stated to friends that he was considering the establishment of a cotton mill somewhere in the Southeast for the manufacture of cloth used in his life-saving devices. These

garments, which are made of a patented cloth which will hold air when saturated with water, enjoy a wide sale in this and foreign countries. At the present time some difficulty is experienced in getting the proper kind of cloth, it was stated, only one mill in the United States making this kind of material, it was said. This is located in Woonsocket, R. I.

Mr. Jordan admitted to friends that he was considering the advisability of purchasing, or preferably constructing a plant which would turn out nothing but the goods to be used for this garment.

Spartanburg, S. C.—Purchase of the Enoree Mills at Enoree by R. Z. and MacLarlane L. Cates of this city for a consideration in excess of $1,000,000 was made last Thursday. The new owners will assume control of the property on July 7.

Ownership of the plant formerly lay largely in the hands of Allen J. Graham of Greenville and members of his family. The Cates bought the physical property of the corporation outright, and were unable to say what arrangements were made with minority stockholders by Mr. Graham, who has been president and treasurer.

Announcement was made by the new owners, who are brothers, that a $1,250,000 corporation will be organized to own and operate the mill. No decision as to who will be the directors and officers in this corporation has been made as yet, the Cates brothers said, although they added that they will retain ownership of all the stock.

Negotiations for the transaction were conducted by W. O. Gray and company, of New York City. The Hunter Manufacturing and Commission company of New York, which has been the selling agent for the mill will continue in that capacity, it was announced.

The Enoree Mill, located on the Enoree river in Spartanburg county 27 miles South of this city, manufactures sheetings and drills. It has 33,000 spindles and 850 looms, all of which are almost new. Employment is given to 330 workers.

The machinery is electrically driven throughout, power being generated in the mill's own plant by the use of a water turbine turned by the Enoree river and a steam engine.

R. Z. Cates, elder of the two brothers, is president of the Arkwright Mills of this city, having been elected to that office last January. MacFarlane L. Cates, formerly a cotton broker, has been associated in the management of the Arkwright Mills for two months. The elder brother succeeded his father, R. Z. Cates, who died in December of the local mill.

Forest City, N. C.—At a recent meeting of the directors of Alexander Manufacturing Company. A. C. Alexander was elected president of the corporation to fill the vacancy caused by the death of his brother, the late J. F. Alexander.

Mr. Alexander is one or the original stockholders and directors and has always taken an active interest in the plant, attending practically all meeings of shareholders and directors.

Mr. Alexander has been actively associated with his late brother in his numerous enterprises in North Carolina, Georgia, Alabama and Florida, where they have large lumber interests. Mr. Alexander is not only in charge of their lumber interests, but is also first vice-president of the Alexander National Bank, of St. Petersburg, Fla., which was founded by the two brothers. They are also large holders of business property in St. Petersburg.

At the meeting Mrs. Alexander, widow of the late J. F. Alexander, was elected on the board of directors to fill the vacancy caused by the death of her husband, as Mr. Alexander's estate was left intact and in full charge of Mrs. Alexander.

This gives the corporation a very strong board of directors, consisting of A. C. Alexander, J. B. Lattimore, J. R. Moore, Mrs. J. F. Alexander, T. J. Lattimore, D. G. Bland, T. A. Moore and J. F. Lattimore.

Mobile, Ala. — Standard Textile Products Company and Mobile Cotton Mills, of Mobile, Ala., McComb, Miss., and Selma, N. C., report for year ended December 31, 1925, net sales of $22,401,467 compared with $19,916,615 in previous year. Net income after interest, depreciation, etc., was $705,633 equivalent after allowing for dividend requirements on the 7 per cent preferred Class A and 7 per cent preferred Class B stocks at $1.51 a share earned on outstanding 50,000 shares of common stock. This compares with $642,950 or 25 cents a share on common in 1924.

For the period from January 1, 1926, to April 3, 1926, company reports net sales of $5,845,261 and net income of $150,615 after interest, depreciation, etc., equivalent to $1.57 a share on the 40,000 shares of 7 per cent preferred Class B stock after allowing for 7 per cent preferred Class A dividend requirements.

Seeing The Mills

(Continued from Page 22)

Opelika, Ala., showed me over the plant and explained its operation.

It uses strips and low grade waste and makes from 1's to 5's yarns, The stock goes through two sets of special wool cards and from the last cards comes out in a number of ends which are wound upon a spool about 36 inches long. These spools are put on top a special spinning frame which really does twisting instead of spinning. In order to make better running work the spindle rail travels while the ring rail is fixed.

The advantage of this system is not in the cost of production which is really higher than on the ordiarny cotton system but in its ability to handle low grade and short fibre stock.

Stock that cannot be spun on the cotton system can be handled on this special waste system and satisfactory results obtained.

I wanted to pay a visit to Mr. Duval but found that I was behind my schedule and I had to leave for Rockingham where I had dinner and then drove to the Aileen Mills, at Biscoe in which I am a stockholder.

I spent most of the afternoon with the superintendent, C. B. Gunn and the treasurer, H. C. Long, Jr. I spent the night in Troy and reached Charlotte Saturday morning.

Morgan Takes Issue With Clark

(Continued from Page 23)

the North Carolina mills are doing the same thing; and night operation, because of keen competition, continues to spread over the entire South. In my opinion, unless night work is eliminated until the consumption catches up with the production, there will continue to be periodically a state of chaos in one of the most important industries in the world.

I am with hesitation and great diffidence expressing to you my views, because I fully appreciate that a man of your rare ability, observation and experience is in a much better position to lead the manufacturers out of the wilderness than one who knows very little of manufacturing, but who, however ridiculous it may seem, still clings to the old-fashioned theory that an obligation once made, regardless of conditions, is still an obligation.

Yours very truly,
CLINTON J. MORGAN.

Changes in Hyatt Personell

In line with the policy of the Hyatt Roller Bearing Company, of Newark, N. J., to still better serve the textile industry, they announce the appointment of Henry Barker Burke as manager of their textile bearing department.

Mr. Burke will make his headquarters at the Hyatt Company office in Worcester, Mass., where C. W. Nugent, Jr. and W. H. Wheaton, Hyatt textile bearing specialists are also located.

Before joining the Hyatt organization, Mr. Burke was affiliated with the Bigelow-Hartford Carpet Company as an industrial engineer—and just prior to that was assistant manager of the Hussong Dyeing Machine Company.

For fifteen years, since the completion of his studies at the Lowell Textile School, Mr. Burke has been associated with the chemical designing, sales and production ends of the textile industry.

Mr. Burke will also cover the Southern territory from the Hyatt offices at Charlotte, N. C., and with J. M. Hancock and L. E. Mulloney, the Hyatt Textile Department representatives in the South, he will serve the mills in that district.

The Hyatt Roller Bearing Company, also announces the appointment of Howard B. Jernee as sales manager of the Line Shaft Bearing Department, succeeding Frank S. Cole. Mr. Jernee is well known in sales and engineering circles through his former connections as construction engineer for E. I. du Pont de Nemours & Co., and later works engineer at the Oakland Motor Car Company plant in Pontiac, Michigan.

Attended Foreign Trade Conference.

The following cotton manufacturers attended the Foreign Trade Conference, at Charleston, S. C., this week, Leroy Springs, Lancaster, S. C., E. C. Dwelle, Charlotte, N. C., Marshall Beattie, Greenville, S. C., and David Woodside, New York.

Manufacture of Fancy Goods—6

(Continued from Page 16)

loom a fancy effect will be produced because of the colors which have been fixed to the individual threads while wrapped about the coloring cylinder.

There are two methods of printing two or more colored designs on the surfaces of cloth. One method is that in which two or more different colors are directly printed on the fabric, such as is used in many print mills. The other method is this character is woven on the plain more of a discharging process than applying one, for discharging agents are used to remove or to absorb color from certain portions of the solidly colored texture in such way as to produce a design.

A fabric of a single solid color, for instance, is reduced to its original clear white stage in specific places by reduction agents, such as the hydrosulphite preparations; on practically the same principle employed when reducing colored rags to a leucco state for shoddy manufacture. Rich colors in calicoes may not be as popular as in the past years, owing to the lure of the silk, rayon and other fabrics of this class. But any mill running on fancy goods has a large field for its printed output from the drapery and curtain houses.

In recent consultation with a representative of a large drapery concern we learned that curtains and hangings for the home to match the wall paper are in better demand. It will be recalled that is was a foreign manufacturer of wall paper who ran some cotton cloth through the rollers of his wall paper printing presses and gave an impetus to surface printing which has continued since. In ordinary surface printing the design is engraved into the roller, while in the wall paper plan of printing colors the design is raised above the surface of the metal. The raised outlines thus produced are packed with felt which absorbs the dye when fed by rollers and in turn prints these colors on the cloth. A surface printing model of this description is shown in the drawing in which the roller number 1 prints the diagonal stripes in a certain color on the cloth, roller number 3 prints the spreckled lines in still another color, thereby producing a three color pattern, although more colors could be applied by using additional rollers, each with a different color dye.

And all of this can be done on cloth on plain looms.

The patterns thus produced on dress fabrics, curtain material and similar textiles are characterized by their soft outlines and rich tone. They are as fast as any colors applied on the surface printing principle, but of course cannot hold up so well in the light or washing tests as similar patterns made in the loom with yarn colored in the hank or in the raw material. But the phrases such as dyed in the cotton, dyed in the silk, dyed in the rayon or dyed in the wool are not as significant now as they used to be. Fast colors made by fast dyes on real and synthetic textiles, and which colors normally stand the tests very well, have rather put the "Dyed in the so and so," and "All wool and a yard wide," in the background. These trade marks that used to help sell or fool customers are not much used now.

Lola Gingham Mill Sold at Auction.

Stanley, N. C.—At public auction the property of the Lola Gingham Mills, was offered for sale to the highest bidder by the Gastonia Insurance and Realty Company, trustee, under a deed of trust to secure an issue of $300,000, in bonds of the corporation. The successful bidder was J. F. Anderson, of Jersey City, N. J., bond holder, whose bid of $120,000.00 was the highest received.

Columbus, Ga.—Columbus textile mills and other manufacturing industries of the local district, will close till the following Monday to permit more than 12,000 local workers to enjoy an annual picnic outing on Saturday. It has been the custom of local industries for many years to close down for one picnic day during the early spring season.

Technical and Research Staff of National Oil Products Company, Harrison, N. J.

Cotton Mill Processes and Calculations

(Continued from Page 25)

stoppage of the whole machine, for breakage of yarn. The double head is not advisable except for very strong yarn, where breakage would be small.

379. A Denn warper may be made single head, single linker; single head, double linker; double head, single linker; double head, double linker.

A single head double linker machine for 2,000 spools weighs about 3,000 pounds.

380. Following is a sample blank to be filled out in ordering Denn warper:

Number of Machines _____
Double Head or Single Head _____
Double Linker or Single Linker _____
Number Spools in Creel _____
Size of Spools _____
Amount of Yarn to be Warped per day _____
Average Number and Ply _____
With or Without Electric Stop Motion _____
With or Without Annunciator _____
With or Without Ball Warp Attachment _____
Width Over All _____
Length Over All _____
Size of Driving Pulley _____
Speed of Driving Pulley _____
Maker _____
Purchaser _____
Price _____
Terms _____
Remarks _____

Beam Warping.

381. Coarse yarns are sometimes put on cheap homemade beams, with a beam warper, and sent to the market in that shape. These beams are built up of wood, similar in shape to regular slasher beams. The ends are bored to receive iron gudgeons to use in winding. These are removed when beams are shipped. At their destination, other gudgeons are inserted, and beams are mounted in the slasher creel. This method of shipping yarn is not much in use, except where the mill is comparatively near the market, so that empty beams may be returned to the mill.

Reeling.

382. Fig. 62 shows a reel, winding yarn from bobbins into skeins. The yarn passes through the thread guide on the frame, and through thread guides on a traversing bar, which spreads the yarn on the arms of the "swift" as it revolves.

383. The arms of the swift are usually adjustable, so that the size of skein may be varied from 54 to 72 inches. The most common size skein is 54 inches, or 1½ yards in circumference. The amount of yarn in a skein is usually the amount that comes from one bobbin, but the purchaser sometimes requires skeins of a certain weight, say 1, 1½ or 2 ounces. It costs more to furnish skeins of a certain uniform weight than to furnish random weights. A special stop motion may be had with the reel, to knock off after a certain amount of yarn is reeled.

384. Such a reel as shown in Fig. 62 will take yarn from warp or filling or twister bobbins. The spindles, on which

bobbins are held, are stationary, and the yarn pull off over the top. This style is called "dead spindle." Reels are also made with "live spindles," which are supported in bearings, and revolve with the bobbins, the yarn pulls. The yarn from live spindle reels usually pulls square off the bobbins from the side, to the traversing eyes, and does not pass through the upper eyes.

PRODUCTION.

385. About half the time of the reel is consumed in doffing and re-creeling, so that its actual production is only about half the theoretical. Reels may run 150 to 200 revolutions per minute. At 150 revolutions, and with 1½ yards circumference the theoretical production per spindle in 10 hours would be:

$$\frac{150 \times 1\frac{1}{2} \times 60 \times 10}{840} = 161 \text{ hanks,}$$

and the actual production about 80 hanks. Of No. 20 single yarn, this would be 4 pounds; No. 30, it would be 2.6 pounds.

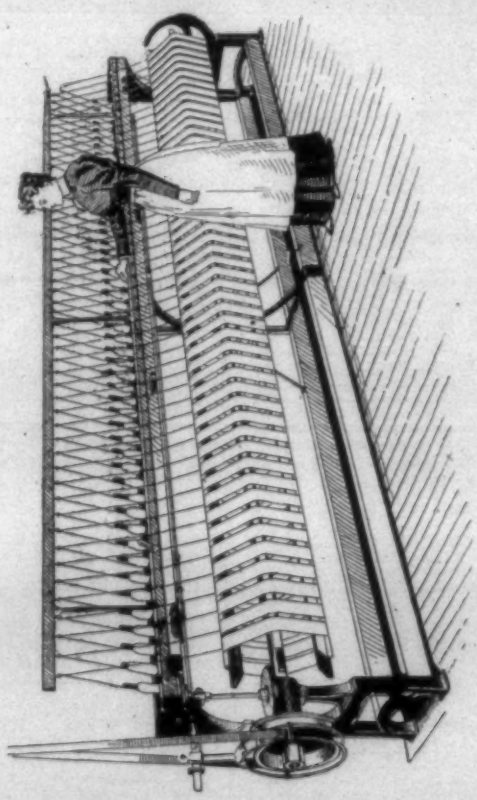

Fig. 62. Reel.

Thus one reel spindle will take the product of about 12 spinning spindles, even at 150 revolutions. The production may be increased in proportion by increasing the speed to the limit that the machine will run, or that the yarn will stand without undue stretching.

GENERAL DATA.

386. Reels are rarely made with more than 50 spindles, for the reason that the swift would be too long to run steadily. They may be made with fewer spindles, but 50 is the usual size. This reel is about 2 feet wide and 16 feet long and weighs 800 pounds.

The driving pulleys are about 12 inches in diameter, and made for 1½ inch belt.

The hand of reel is determined by standing in front of the swift, and noting whether driving pulley is on right or left hand.

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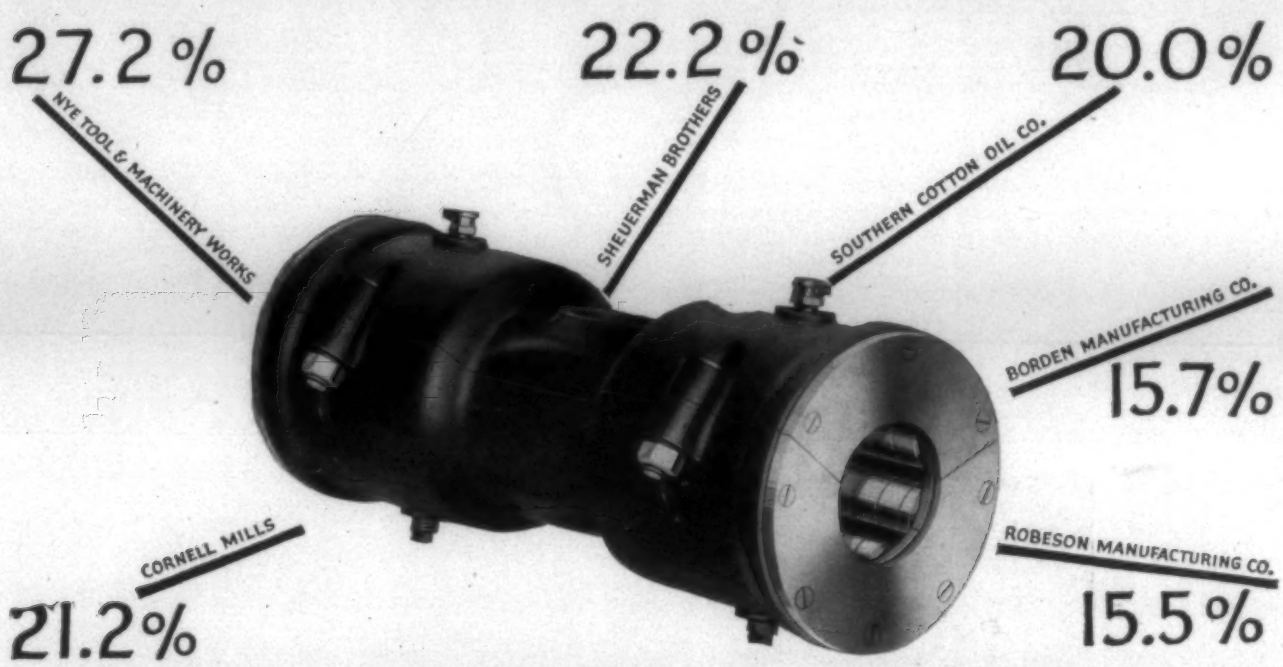


Proof of Power Savings

Manufacturers of widely diversified products report that Hyatt Line Shaft Roller Bearings are cutting their power bills from 10 to 25%—*an average saving of 15%.*

They figure that their investment in Hyatt bearings is bringing an annual return of 50 to 125%. Thousands of Hyatts have brought this return, consistently, for 20 and even 30 years.

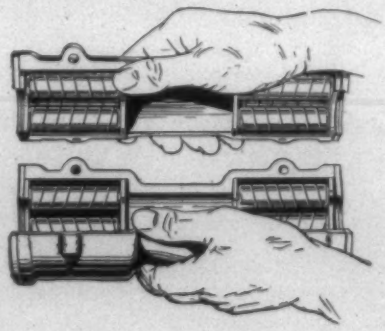
And most of these original Hyatt bearings are still rolling out dividends.

Hyatts also cut the cost and care of bearing-maintenance. Three or four oilings a year—no other attention—keep them steadily on the job.

Compare Hyatts with any other anti-friction or plain bearing. You will find Hyatts giving better, longer service.

For high-grade bearing efficiency, specify Hyatts.

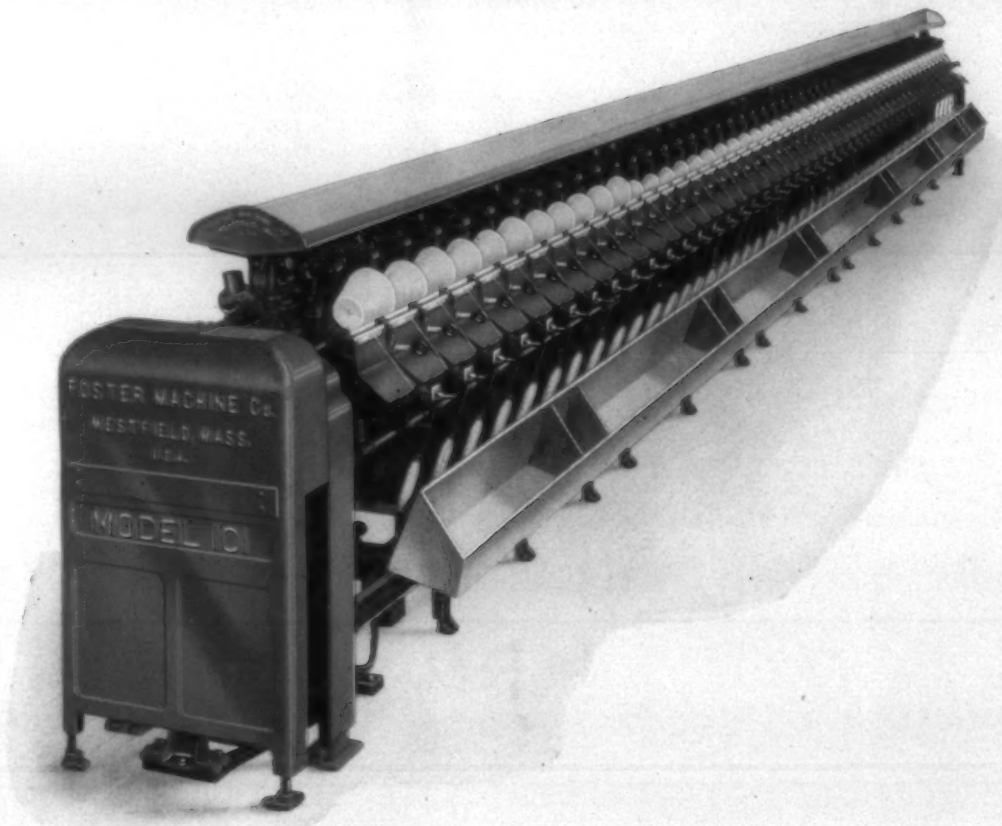
Saves 15% of your total power bill. Completely split, for easy installation.



HYATT ROLLER BEARING COMPANY
Newark, New Jersey

HYATT
ROLLER BEARINGS

Model 101



The latest design Foster Winder

for

Cones, Tubes, Cheeses—Cotton or Worsted

We invite investigation of the following claims:—

The highest winding speed ever developed.

The greatest production per spindle, per operative, per foot of floor space and per dollar invested.

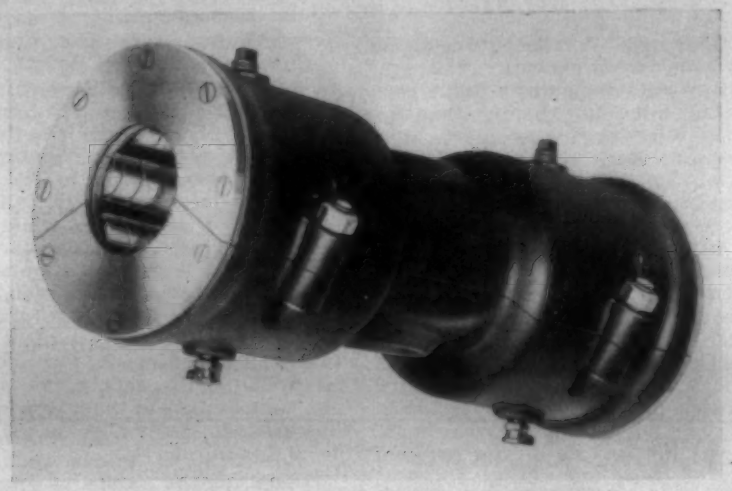
The Foster Knitting Cone produced on the Model 101 has the correct wind, taper and density and maintains the high standard reputation, of **Foster Wind** in the Knitting Trade.

Foster Machine Company

WESTFIELD, MASS.

John Hill, Southern Representative, Healey Bldg., Atlanta, Ga.

Hyatt Markets New Line Shaft Bearing



Hyatt Line Shaft Bearing Showing Narrow Center.

The new Hyatt Line Shaft Bearing is an exact size for size replacement box. It it completely split for easy installation and fits any type of hanger. Although it differs in outward appearance from other Hyatts sold during the past 35 years, the distinctive helically wound rollers are still employed.

The box is dumbell in shape, with twin split roller assemblies mounted at either end. The center section, which is free from bearing surface, is narrowed down to average plain bearing surface, bearing dimensions, to fit hangers with the narrowest frame openings.

The bearing element is made up in the "new series" type recently adopted by Hyatt for all their high duty bearings. The bars through each roller maintain equal spacing and alignment and form a stronger cage or retainer.

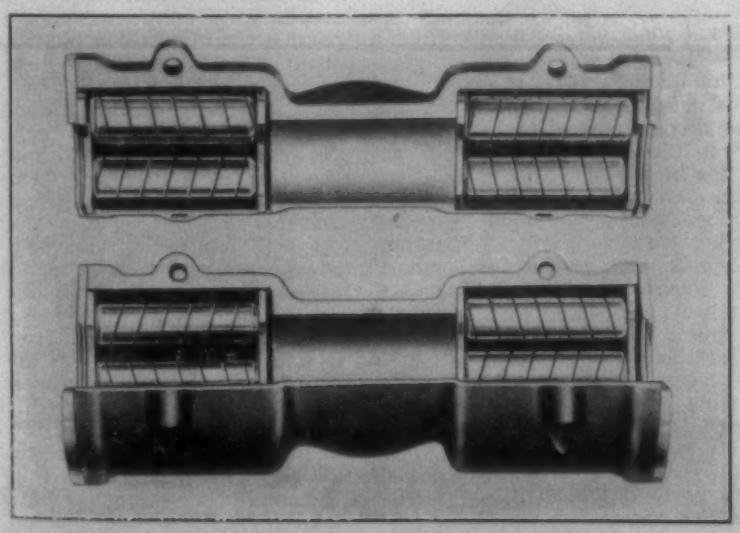
The box is built in two sections, the lower part forming two thirds, and the top, one third. This brings the machined joint well above the oil level and prevents oil leakage. Tightening four bolts seals the sections around a shaft. Bosses are staggered so that the top cannot be improperly fitted. A small wrench is the only installation tool used.

The ease of installing the new Hyatt bearing was strikingly demonstrated at a large mid-western plant. Failure of a plain bearing near the middle of a long transmission line necessitated immediate replacement. Production could not be stopped, so it was necessary to apply a bearing while the shaft was turning. Only seven minutes were required by the man to remove the worn bearing and apply the new Hyatt.

While this practice of applying the bearings with the shaft turning is not generally recommended by the Hyatt Company, it shows that they can be installed easily and quickly whether the replacement be a single bearing or an entire line of them.

The Hyatt Company reports that one filling of lubricant every three or four months is the only attention this new bearing requires, no matter how hard the service. And even though a lubricating period be occasionally skipped, no harm will be done the bearing. Grit and other substances that tend to break down the oil film are drawn away from the bearing surface through the slots in the hollow rollers.

They further report that tests conducted by various engineers and readings in plants where the new Hyatt is used, indicate a 15 per cent saving of the total power bill in its favor. This checks closely with figures established in hundred of plants using the former type.



Hyatt Line Shaft Bearing Showing Split Feature.

The European Situation of 1926

(Continued from Page 12)

of Germany. Whatever conclusion payments were met; for the first half of 1925-26 payments have been met in full. It develops that tax levies were producing more than needed for such payments and taxes have accordingly been reduced. The actual transfer of the payments for the year 1924-25 and the first half of 1925-26 have been met almost entirely through deliveries in kind and collections under the Recoveries Acts of the various allied countries. These latter, again, are in effect deliveries in kind. The Agent General reports that the only actual transfer of gold or gold exchange for the first half of the year 1925-26 was the service of the external loan of 1924, amounting approximately to twelve millions four hundred thousand dollars. Statements made by the Agent General indicate that he expects transfers for the balance of the year 1925-26 and for 1926-27 to be made almost entirely in the form of deliveries in kind, including the deliveries under the Recoveries Acts, and brings out clearly the thought that the allied governments might well be studying, in fact some of them are studying, methods for expanding deliveries in kind of raw and semi-raw materials and manufactured articles and particularly in connection with the developments of new projects, either in the allied countries or in their respective colonies, using German made products, paid for by reparations, as the equity against which loans can be obtained for the completion of such projects and without which equity projects would be difficult, if not impossible, of realization. Even those who honestly feel that the burden on Germany may prove onerous do not fear that this will develop until 1928-29, the first year of the standard payment of twenty-five hundred million gold marks.

By that time it is more than possible that most of the creditor nations will have developed many ingenious devices for realizing on reparation mark credits and that such realization will not tend to affect adversely the German economy nor its exchange position, and this too with a definite benefit to the nationals of the allied country so realizing.

The expert's plan is elastic and does not break down even if for a period some part of the accumulated reparations credits seem difficult of transfer under these conditions such credits as accumulate and are not usable in a particular year may be invested in German obligations up to a very respectable limit of five thousand million gold marks. Can we not assume that the difficulties in the way of realization on reparations credits are not as great as pictured? Most writers in discussing it treat the transaction as dependent on international trade as it existed before the war. Think what the effect of new projects in the consumption of these credits may be.

Let us turn to the question of how much of a burden the reparations charge actually is on the German producers. The annual income of Germany for the year 1925 is set up by statisticians at about fifty-five billion marks. The standard payment, beginning in 1928-29, calls for the collection and deposit in the Reichsbank of twenty-five hundred million R. M. This is less than 5 per cent of the value of annual income; in other words, 95 per cent of income must support the full 100 per cent of producers, while the remaining 5 per cent is applied to reparations. Reduced to the worker's hours, if, as is now contemplated, the worker's week in industry is to be forty-eight hours, a little over two hours per week out of the forty-eight will produce the worker's contribution to the credit in the Reichsbank. Does this sound like an undue burden?

Comparing the burden of the reparations collection with the burden of taxes collected before the war for the maintenance of the Military Department of the German Government, we find that the actual accounted for outlay for the year ending March 31, 1914, was over sixteen hundred million Reich marks (four hundred seven million dollars), that is over two-thirds of annual standard reparatio npayment. To this should be added the free services rendered by the other governmental agencies such as free transportation of men and materials on all railroads and a certain proportion of the ship subventions and the loss of the productive power of the men so withdrawn from industry and we find a considerably greater burden for the support of the military than is required for reparations.

As to the immediate situation in Germany the testimony varies. The report of the German Committee to the International Chamber of Commerce, made in March this year, gives a discouraging picture. The investigation and reports made by our own economists of outstanding ability are, on the contrary, optimistic. The report of the Reich-Kredit - Gesellschaft Aktiengesellschaft for the second half of 1925 does not give a discouraging picture like that of the German committee but on the whole a brave and wholesome picture. Taking all of the evidence, and we must take the evidence and testimony as showing trends, while at the present moment there are difficulties in industry but with an improved trend in unemployment and increase in bankruptcies, especially of smaller and untried and inexperienced concerns, yet some of the leading German authorities, as well as our own, conclude that it will prove temporary and that it is nothing other than the crisis that might be expected from the readjustments following stabilization and especially from the raising of old and building new tariff barriers in Europe and from the competition Germany is in with countries where currencies are steadily depreciating and which we now all recognize is one of the most disturbing elements in foreign marketing. The evidence is strong that the condition is temporary and will finally result in the marked improvement of the economic health

is reached must be based on the general trends and these things have happened in Germany in two years—her currency has been stabilized, her budget brought into equilibrium, the Reichsbank has increased its gold reserve, bank deposits—both savings and checking—have increased markedly, savings deposits having more than doubled during 1925; average wages in industry to skilled and unskilled labor have been increased during the year over 20 per cent; taxes have been reduced; interest rates have been reduced; hours of labor in some industries have been reduced.

To discuss the second important factor about which the other factors revolve, to-wit, currency stabilization. We all recognize that in countries where currency values are still depreciating the immediate effect domestically is to speed up business and in such countries it is generally found that domestic business is in full tide. Of course this is paid for by the country itself through gradual destruction of its capital and until stabilization obtains in all the important countries the other countries where currencies are stable suffer in foreign trade and we cannot hope for complete recovery of the economic health of Europe until stabilization has gone further than at present.

The most disturbing, of course, is the depreciation of the French currency and the from time to time governmental authorities, of that country, are quite in accord that its devaluation should be stopped. The first step has been taken, legislatively the budget has been brought into balance. It remains to be seen whether the taxes called for under the law can be collected. Would it not be easier to collect the taxes if the value of the currency was made definite and was either legislatively stabilized or practically stabilized at some given value? Would it not be quite possible for France to stabilize its currency if it could arrange credits, not extremely large ones, to protect the currency from speculative onslaughts? Would there be any question about the ability to obtain such credits if a basis for adjustment of her external debts had been fixed?

I recall that two years ago last March the franc was at nearly as low a level as now—my remembrance is 27 to the dollar, now thirty to the dollar; that then, as now, there had been great short selling of francs. A credit of one hundred million dollars was arranged by the Bank of France, a relatively small part, probably not to exceed fifteen millions of the credit was used; within forty days the franc was brought back from 27 to fifteen to a dollar, the fifteen million dollars repaid and a handsome profit realized against the speculators, variously estimated from fifteen to thirty millions.

As an incident of this, it is said that the American tourists in their expenditures in France during the following six months paid out from fifty to sixty millions more than they would have been called upon to pay if the franc remained at 27 to the dollar. It is possible that the forward short selling is not in as great volume as two years ago but it is not demonstrable as such transactions are carried on under cover as far as possible.

It is true that the flight of capital continues and that capital will only return with stabilization. However, it appears the difficulties in the countries having unstable currency are not insurmountable.

To touch on the conditions in some of the other countries:

Great Britain does not show any great changes. Her greatest difficulty apparently lies in the coal question. Just what the outcome of the struggle next month will be it is difficult to tell. The resumption of the gold payments has worked out as planned and to the satisfaction of its proponents. There is less unemployment than a year ago, such reduction is due more or less to artificial causes. The outlook for British trade is better than for several years.

In Italy the most important thing is the fact that Italy reached a basis for the adjustment of her indebtedness to England and likewise with the United States War Debt Commission, just confirmed by the United States Senate, and while this indebtedness so fixed forms a burden which must be carried by the next generation or so, yet it eliminates one of the unknown factors and has put Italy in a position for obtaining loans and generally the conditions in Italy are good.

In Belgium they have imposed new taxes to balance the budget and are considering, if they have not already passed, the necessary laws for stabilization and Belgium may be considered to have come in with the countries who have stabilized their currency. In some lines of production, Belgium shows improved conditions ,such as in the textile industry; in other lines, the difficulties are greater. On the whole, the condition of Belgium seems to be satisfactory.

Austria, working under the plan of the League of Nations, appears to be in a satisfactory financial position. The state revenue exceeded the budget estimate; the bank rate has been reduced and the reserve of the National Bank has been increased. Here again, as in Germany, is a crisis in production and marketing and there is a marked increase in unemployment.

Czecho-Slovakia seems to be carrying on very satisfactorily and for the year 1925 shows a marked increase in foreign trade with a favorable trade balance of twelve hundred and five million Czech Crowns. Through the medium of a New Central Bank the government has legislatively stabilized the Czech Crown at the rate of 33.85 to a dollar and the New Central Bank is under contract to keep the Crown on this basis of exchange for at least two years.

In Denmark they are gradually approaching a gold standard basis. The conditions in Denmark generally are fairly good. The same may be said of Holland.

Poland has suffered a serious fall in the value of her currency, has had an increase in unemployment but this is being met in part by

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CAUSES OF BAD RUNNING SPINNING

(Continued from Page 18)

most all the time, and if you have a few ends on each side that run bad, your spinning will all look like it is running bad.

Have a regular time for your spinners to clean up their sides, and see that the cleaning is done. Don't take their word for it.

When the spinning is overhauled see that the flutes in the steel rolls are good. If any of them are battered up, have them filed out and smoothed up, and if they are worn have them renecked.

Use plenty of weight on your top rolls, but not too much. There is nothing like a good humidifying system. The humidifier plays a very important part in the spinning room. I think an automatic system is better, but, however, the others can be used to a great advantage. Watch your numbers very closely and keep them as near right as you can.

Caution the doffers about breaking down too many ends and don't let them wind about half of their ends when they piece up after they doff, because this makes it hard on the spinner, and a lot of times gets the spinner balled up.

Oiling is another very important thing. A good oiler is a mighty good thing to have in the spinning room, because if your work is not oiled it won't last long, and it will not run good, and it will soon wear out.

Try and keep down your waste as much as possible, for the less waste you send back to the opening room to be worked over, the better your spinning will run. Use standard draft, or as near standard as you can; also use standard twist, if it will run with standard twist. If your work doesn't run good on standard twist put in more, if you can get by with it.

These things which I mention are things which I have learned by experience, and I did not learn them out of a book.

Cyrene.

The Story of Cotton

(Continued from Page 14)

It is plain that he had a quick eye, plenty of intelligence and industry, and a good deal of what is called constructiveness. This gift of constructiveness enables people to find out the principle of mechanical contrivances, and to understand their working. Those who are without it find the greatset difficulty in learning the action of such a simple piece of machinery as a pump or a meat-jack. Very likely they will go through life without comprehending them at all. Those who have this gift in a high degree, grasp at once the idea of a steam-engine, or a power-loom. The gift is a natural one, though no doubt it may be improved by cultivation. Young Arkwright possessed a large share of it, and he used it to good purpose.

When first we hear of Richard Arkwright, he was a barber and an itinerant dealer in hair for the making of wigs, which at that time were worn by almost every gentleman. Even in this humble calling we observe traces of his quickness and intelligence. He found out a new process for dyeing hair, still rather a delicate operation of chemistry, and the hair he supplied was considered the best in the country. The folowing story is told respecting his first setting up for himself in business. He took one of those cellars in which the poor of Manchester generally live, and placed this placard outside, "Subterranean shaving with keen razors for a penny." The young barber had plenty of customers, for the usual charge was twopence. In time however, others took to shaving for a penny, on which Arkwright lowered his terms to a halfpenny. One day a cobbler presented himself with a remarkably strong, thick beard. Arkwright declared it would spoil his razors to shave him, and accordingly asked for a penny. The cobbler decline to give it, so Arkwright took the halfpenny, and further handed the man two pairs of shoes to mend. It is said that this very cobbler first showed him some mechanical contrivances which set his mind at work upon the great question of the day, cotton spinning.

This story may or may not be true. The young hair-dealer had of necessity to travel a good deal in the course of his business in Lancashire and the adjacent counties. He could not help noticing how the cotton trade

Arkwright was now satisfied that in the water-frame he had the right machine for cotton-spinning. but he dreaded his neighbours and their hatred for machinery. As soon then as the election was over he carried his invention to Nottingham, and showed it to Messrs. Need and Strutt, stocking-weavers of that place, Hargreaves' former partners. One imperfection still annoyed the inventor—the fibres of the vegetable wool used sometumes to stick to the roller and clog it up. He complained of this to Mr. Strutt, who said at once, " I will undertake to remove the obstacle if you will give me a share in the profits of the machine." Arkwright agreed; Mr. Strutt took a lump of chalk out of his pocket, and applied it freely to the roller. The cotton no longer stuck to it.

Messrs. Need and Strutt at once took Arkwright into partnership. They set up a spinning-mill in Nottingham, and another at Cromford in Derbyshire,—Cromford, which has been called the nursing place of England's factory-power and opulence. There Arkwright went to reside, there some of his original water-frames are still at work spinning good yarn, more than eighty years after the head that designed them was laid in the dust. Arkwright made several further improvements in the processes of carding and spinning, and then took out patents for his different pieces of machinery.

But the work of other brains besides his own awg included in his

For Sale
Knitting Mill in Germantown, Philadelphia. To be sold as a whole. Full fashioned machines, now on knitted ties. Excellent equipment. 15,000 feet floor space; long lease $100 per month. Bargain. Write for particulars. C. B. Drake, 507 Cherry Street, Philadelphia.

Napper Man Wanted
Small plant would like to employ experienced napper man for three or four weeks. Want man who is thoroughly familiar with nappers. Address reply to J. E. H., care Southern Textile Bulletin.

Jake Conrad
Aged about 17 years, left home three months ago and has not been heard of since. Weighs around 140 pounds, height, 5 ft., 1 inch, black hair, hazel eyes, slight impediment in speech. His mother, who is an invalid, is greatly worried and would appreciate any information. Address Mrs. J. M. Lundeen, Warrenville, S. C.

scheme, and this gave rise to endless difficulties. The original spinning-jenny was clearly Hargreaves' invention; Arkwright allowed this, yet it was included in the patent. And Kay, who helped in constructing the water-frame, turned against his former friend, and declared that the water-frame was no device of Arkwright's, but of a poor reed-maker, named Hayes. Many cotton-spinners, professing to believe this story, it may be really believing it, introduced Arkwright's machinery into their factories, in spite of the patent by which he had endeavoured to protect it. To this he would not submit, but went to law in each case that came before him, till he had nine law-suits going on at one time.

There was still a strong feeling in Lancashire against the introduction of any fresh machinery. The first mill that Arkwright set up in that county was burned to the ground by a mob, and he was molested in every way. His servants and work-people were bribed to leave him and manufacturers combined not to buy his yarn, though it was allowed to be the best in the market. Arkwright and his partners therefore wove their yarn into stockings, and found that it answered that purpose exceedingly well. Next they set up looms, and proceeded to make it into calicoes, of which both warp and weft were made from the vegetable fleece—the first of the kind produced in England. But strange to say, these calicoes, though made entirely on the banks of the Derwent, were rated as Indian goods, and a duty of sixpence a yard was levied on them, not three-pence, which was the duty then on English made calicoes.

Arkwright and his partners petitioned the Legislature for relief, but the Lancashire manufacturers, jealous of the new material, opposed them. However, after much trouble and delay, the new calicoes was only required to pay the three pence a yard, which had long been levied on the mixture of cotton and flax. Up to this time Arkwright had reaped no reward for his ingenuity and industry. He used in after life to declare that his schemes did not begin to pay till he had preserved in them for five years, and had expended twelve thousand pounds. Then the tide turned, and he began to make a fortune rapidly. Money flowed in fast, partly from the sale of his inventions, partly from the profits of the manufactories in which he had a share. Arkwright lived in splendour in the beautiful house he had built on the banks of the Derwent, overlooking his extensive mills. But he did not lose in these prosperous days the industrious habits of his early life. After his fiftieth year, having leisure to supply his want of early school education, he set apart an hour in the morning, and one in the evening, for practising handwriting, and learning spelling and grammar, and this in spite of his constant and severe sufferings from asthma. He was made High Sheriff of Derbyshire, and was knighted by George III, after presenting him with an address of congratulation on his escape from assassination by the mad woman, Margaret Nicholson. After presenting each of his children with the sum of £100,000, he left at his death half a million of money. His son Richard, who carried on his father's undertakings, and who was called the richest commoner then in England, left several millions of pounds behind him.

A poet of Arkwright's day describes Cromford mills,—

"Where Werwent guides rise dusky floods,
Through vaulted mountains and a night of woods."

He also describes in curious, old-fashioned verse the spinning of cotton as it was carried on there,—

"First, with nice eye, emerging Naiads cull
From leathery pods the vegetable wool;
With wiry teeth, revolving cards release
The tangled knots, and smooth the ravelled fleece.
Next moves the iron-hand, with fingers fine,
Combes the wide card, and forms the eternal line;
Glow with soft lips, the whirling can acquires
The slender skeins, and wraps in rising spires.
With quickened pace successive rollers move,
And these retain, and those extend the rove;
Then fly the spoles, the rapid axles glow,
And slowly circumvolves the labouring wheel below."

Darwin, the author of these lines, adds in a note that Sir Richard Arkwright's ingenious machines have greatly shortened and simplified the task of carding and spinning cotton-wool, so that "it is probable that the cloth of this small shrub may become the principal clothing of mankind." This prophecy has been fulfilled in a shorter space of time than its author could have dared to expect.

Sir Richard Arkwright's merits as an inventor have been questioned. It has been said that he only put into practice what other men devised. This may in part be true—to what extent, nobody can now tell with certainty. He was mixed up with men clever, like himself, in machinery. They were always talking about it—always trying to discover what was then so much wanted, a better mode of spinning cotton. How can we divine how much he owed to them, how much to himself? Very likely he could not himself have told. We have no reason for doubting his honour and uprightness of character, and he was certainly a man of great energy, quickness, and ability. Nor should we forget that he introduced into the manufactories under his charge a system of order, industry, economy and cleanliness, till then unknown in any establishments where many people were employed together—a proof not only of his force of character, but of his high moral tone.

(To be continued)

The European Situation of 1926

(Continued from Page 37)

governmental public works, but Poland had, during the last year, a fine harvest.

The outstanding happenings for the year 1925-26 to date, and chronologically, and not necessarily in the order of importance, would be the Locarno pact, not that it in itself changes the economic situation but rather that it shows a new spiirt for composition of difficulties and that spirit in itself will form the background for important favorable economic trends. Next, the additional determination of a basis for payment of unsettled debts due the United States and also the unsettled debts due Great Britain. Adjustment having been made with the United States by Great Britain in 1923; by Poland in 1924 and during 1925 a basis arrived at for the settlement of the debts for nearly all of the remainder of the debtor countries, including Belgium, Italy, Rumania and others, and it is hoped that the year 1926 will show a basis of adjustment with France and that there may flow from such adjustment credits that may in turn stabilize the currency in France and through this some expect to steady the international trade in Europe.

During the same period the basis of settlements due as between other countries, particularly those due to England, has been settled; and during the year 1924-25 and the first half of 1926-26 the Dawes' plan has, in the main, worked very well and there are no immediate difficulties in sight.

Of at least equal importance is the restoration of the gold standard in Great Britain and this was made possible, as I view it, largely through the wisdom and courage of the Federal Reserve Banks of the United States, operating through the Federal Reserve Bank of New York. When I say "courage" I do not mean that it was risking less, but courage to face criticism that was bound to follow for extending credit (not yet used and possibly never to be used) to a foreign nation to allow that nation to put itself in as strong a position to reenter the exchange markets of the world as a leader.

In addition the currencies of most of the other European countries have been placed either on a gold basis or brought to a point where they are practically on a gold basis.

Lastly, during the year the advances made by private arrangement in the United States to the governments, political sub-divisions and private concerns in various countries of the world amounted to a billion three hundred million dollars and of this Germany received in the neighborhood of 233.3 millions, other European countries received 376.9; Canada 260.6; South America 198.8, while Central America received 24.2 and the Far East and Oceania 162.9 million dollars. That we are to continue in making such advances in amounts somewhere in the bracket of the year year 1925 seems certain.

Apparently, in this respect, we are doing our full share at least towards rehabilitation.

I have cited these happenings of the last year in an endeavor to show in a sketchy way the present situation in important European countries and believe that you will agree with me that to say that conditions in European countries have not shown immense improvement is to overlook all of these trends. On the other hand, to say that there are not serious obstacles to be overcome would be not to face the facts bravely and yet the obstacles from a financial and economical viewpoint are certainly not insurmountable and it is my belief that if political machinations made possible by the fact that the democracies propose for the present, at least, to control in such questions be eliminated the adjustments will be rapid and effective.

Above all, when we hear the Germans cannot pay and that the franc is doomed, let us remember that the first is certainly not true yet—the chances are it will never be true; that the rough figures show that quite the opposite is true—that Germany can and will pay unless deterred by her creditors and let us remember that stabilization of depreciated currency looks entirely feasible if certain necessary steps can be taken without too much political intrigue and political interference.

While we recognize that great difficulties exist in the European situation and that others are bound to develop, as those now existing are overcome; yet, at this time, none appear in sight that are impossible of solution.

When we remember that the making of these adjustments, past, present and future, always make for new difficulties and new adjustments, and when we remember that all such adjustments are made by governmental officials, always with the thought of satisfying the voting population, and, unfortunately, generally the most vociferous part (though a minority of such population) of their particular democracy; when we remember that in some of these democracies until very recently the voters have been without interest or understanding of such problems, in some cases because the voters had no voice of control in such matters, in other cases where the voters are only beginning to realize that adjustments of questions arising outside their national boundaries really affect them; when we understand these things, we begin to appreciate how difficult is to be the working out of all such problems.

However, during the past fifteen months there has been marked, actual and definite improvement of the machinery of foreign and domestic trend in trade and industry and finance in most of the European countries and also a better actual economic and financial condition. Many steps have been taken in various countries and in various directions that show a distinctly favorable trend.

We should, I think, look for the general situation in Europe for the year 1926 to show a distinct im-

provement over the year 1925 in living standards, wage increases, shorter working hours, adjustments in undue tariff obstacles — all of which would benefit commerce and if such improvement should come we may expect to participate.

One development in Europe is possible, even probable in this calendar year—that is the expansion of international, raw material and industrial trusts, already a matter of great moment to us.

These promise to be formidable organizations if they can be held together and where a participation is not contemplated we may expect competitive difficulties. To what extent the creation of these trusts is the outgrowth of the feeling that they must combine for protection because we have not, since the war, at least, governmentally participated fully with the European countries in the effort to make readjustments and to what extent it is the result of economic pressures that are natural and should come in any event, only time will show.

Developments in International Textile Situation

The consumption of American cotton by world mills is estimated by the International Cotton Federation at 6,987,000 bales during the six months ended January 31, 1926, against 7,049,000 during the six months ended July 31, 1925. Recently, a slight improvement has been evident in United Kingdom, Spain, Partugal, and Poland. Conditions in France, Netherlands, and Japan continue good while in Germany, Italy, Belgium, Czechoslovakia, and some minor countries they are less favorable, reports the Textile Division Department of Commerce.

British Spinners Increase Operations.

The vote returned by the spinners of the American section on March 31 favored the increased working hours from the present 30½ to 35 per week. The tone of the cotton-goods market at the end of March was generally better.

French Cotton Mills on Full Time.

French mills are operating full time and even with some overtime, working on old orders. Weavers are reported to be booked through May

German Industry Continues Depressed.

German cotton mills are reducing operations and a considerable number of the operatives are on short time. Orders are decreasing in volume.

Italian Mills Somewhat Less Active.

At the end of March there was some slackening of operations in Italian mills, attributed in part, to a sharp decline in export demand.

Belgian Spinning Mills Slowing Down.

During January and February there was a falling off in the export demand for yarn and Belgian spinners were obliged to reduce operations. The weavers, however, increased their activity, having booked large orders for cloth for the domestic market and for export.

Czechoslovak Spinning Mills Reduce Operations.

Due, in a large measure, to the falling off in the demand for yarn from Germany, the Czehoslovak spinning mills are now running at a reduced rate. The demand for finished goods is well maintained.

Netherlands Spinners Working Full Time.

Spinning mills in the Netherlands are well supplied with export orders and are operating at full capacity. The weaving mills on the other hand, are not fully occupied. The export demand for cloth is reported unsatisfactory.

Spanish Textile Situation Improved.

At the end of February an improvement occurred in the cotton industry of Barcelona, Spain. Production is increasing and output is absorbed readily.

Polish Mills Resume Operations.

At the beginning of March some idle Polish mills were reported to have resumed work. The curtailment during January and February was heavy.

Portugal Reports InCreaced Activity

Practically all Portuguese mills increased operations at the end of 1925. The majority of the mills able to dispose of their stock gradually.

Other European Countries.

In Austria depression still continues in the spinning industry. Unfilled orders fell off from 10,100,000 pounds at the end of December to 9,400,000 at the end of January. The demand for cotton goods in Hungary is reported weak. Danish mills operate at less than half their normal capacity. Unfavorable conditions are reported from Sweden. The largest mill in Esthonia reduced operations. On the other hand, brighter prospects are reported from Latvia and Finland reports an active cotton trade. Greek mills are working at their full capacity and prospects for the immediate future are better than previously anticipated.

Japanese Spinners Employed Full Time.

Spinning mills in Japan are operating at full capacity. The mills in Japan ar eoperating at full capacity. The current rate of cotton consumption is about 18 per cent above that of last year.

Status of Danish Textile Industry.

The Danish textile industry is passing through a crisis, Commercial Attache H. Sorensen, Copenhagen reports to the Department of Commerce. A survey in March showed that cotton mills were operating at 41 per cent of normal production, clothing factories at 31 per cent, wool mills at 59 per cent, hosiery factories at 57 per cent, dye works at 53 per cent, nad other enterprises 49 per cent of normal. During February there was an increase of several hundred in the number of persons employed, due to the fact that several clothing factories again started operations as a result of new orders but because the factories in question were engaged in making up new sample collections.

Recommend Rayon Specifications

(Continued from Page 8)

agove this mark the higher capacity of testing machine shall be used.

31. The machine shall be equipped with an automatic charting device to record stretch at any load.

32. Any tendency to friction, back lash, or play in the recording device, lower jaw, or screw, shall be overcome as far as practicable by counter balancing.

33. Jaws—Clamps for holding the 200 end test skein shall consist of flat metallic jaws. These shall be covered with one layer of rubber tire tape which shall press directly against the specimen. One gripping surface shall be hinged or swiveled and the other shall be rigidly connected to the frame of the jaw. The pressure between the jaws shall be secured by any suitable mechanical device so constructed as to grip the yarns firmly before the testing load is applied and prevent visable slippage during the progress of the test.

34. The initial distance between jaws shall be 10 cm. (4 inches). The skein to be tested shall first be clamped in the upper jaws, spread out evenly so that the ends are parallel, forming a ribbon approximately ⅜ inch to 6-8 inch wide. The rayon is then drawn down through the lower jaws and spread out to make a band of equal width, pulled just taut and clamped.

35. Speed—The pulling jaw shall travel at a speed of 6 inches per minute.

One test shall be made on each of the 10 skeins prepared as in paragraph 25 and the average of these 10 tests shall be the strength.

B—Alternate Method.

36. Five single strands from each of 10 spools, cops, tubes, cones, or skeins, shall be broken after conditioning skeins for three hours and any other form of package for 12 hours in an atmosphere of 65 per cent relative humidity and 70 degrees Fahenheit, kept in rapid motion by an electric fan. A single strand tester of proper capacity with the jaws set 10 inches between grips and having a speed of pulling jaw of 12 inches per minute, shall be used.

37. The average of 50 tests shall be the ultimate strength.

XI. Twist.

38. The twist shall be determined on any standard twist tester with jaws set 10 inches apart. The yarn shall be clamped in the jaws under a definite tension by attaching weights. The tension to be used shall approximate a value to be determed by the following formula:

$$\text{Tension in grams} = \frac{\text{Specified denier}}{30}$$

Example: The weight for 150 denier rayon would be

$$\frac{150}{30} = 5 \text{ grains}$$

39. Two tests, from each of five spools, cops, tubes, cones or skeins, shall be made and the average of these ten tests calculated to turns per inch shall be the twist.

XIII. Moisture Regain.

40. The standard moisture regain of nitro-cellulose, viscose and cuprammonium rayons shall be 14.5 per cent of the dry weight.

41. The standard moisture regain of cellulose-acetate rayons shall be 6.5 per cent of the dry weight.

Cutting Costs

We have reached a period in the life of industry when every man must do everything he possibly can to reduce the cost of production. During the war when orders were plentiful and competition was a thing of small concern, workers could "get by" with any kind of work and employers did not have to worry so much about cutting costs. This condition has change today.

We are now in the midst of trying times for industry. Competition is keener than it has been for a long time the market are slow; and manufacturers in some lines have been forced to sell their goods at very low prices in order to move their products at all. This has been especially true in most textile lines.

What does this mean to the employer? It means that he must cut his manufacturing costs to a minimum in order to run at all. If he lets a single unnecessary leak get started, his business will soon go to the bottom.

What does it mean to the employee? It means that he must cooperate more closely in reducing expenses than ever before. Some small-minded workers may argue that they will not be hurt if the concern for which they word should go to the wall. They think that they have no money invested in the enterprise and, therefore, cannot lose anything. That is a mistaken idea, for they are the ones that would suffer most. After all, the capital that keeps business going belongs to all, for although it may be in the name of one person it is working for and benefitting society as a whole.

It is the duty of every person in our organization to keep down both the waste of time and the waste of material. It is only by so doing that we can hope to keep our wheels turning and an income for all concerned.—The Arrow, Spray, N. C.

Worth Mills Banquet.

The third semi-annual supper given by the Worth Mills, to the overseers and section men was held Saturday evening at 7:30 o'clock in the Westbrook Hotel, Fort Worth, Texas.

A very delightful menu was served, and a most interesting talk by the agent Mr. Towers on the early history of cotton manufacturing was greatly enjoyed.

A half hour was given over to shop talk, everyone present joining in.

The progress of the mill, which is a young one, was reviewed and everyone present was satisfied in his own mind that Worth Mills is destined to take its place among the successful mills of the country.

Plans were talked over for the mill picnic the coming summer, and also for inviting the next meeting of the Texas Textile Association to Fort Worth.

Long Draft Spinning Cuts Costs

(Continued from Page 10)

make our 60 yarn from a four process 12 hank double roving. Today this same yarn is being spun from a two process, 2.60 hank single roving, with a saving of five or six cents a pound. It has always been our aim to make this particular yarn as good a product as possible, taking into consideration the cost fo producing and the class of goods into which it would be woven.

When the longer drafting was given consideration, a great deal of time and thought was taken to determine whether we would be satisfied with a maximum saving and the production of a yarn equal to that made on shorter draft, or a smaller saving and a better yarn. It was finally decided to make a yarn equal to that made previously and effect a greater saving. How well this has worked out can be better shown when I say that the yarns are equal in breaking strength. Spinners prefer the long draft. Stops per loom per hour are practically the same. Less than 4/100 of a stop per loom per hour was the difference between the two systems. Production on looms with long draft has equalled or surpassed the shorter draft, all with the saving, as mentioned previously, of nearly six cents a pound. This system has been tested on rather a large scale during the past four months, and we have been unable to determine any mechanical defects in the apparatus. Speeds on the frame and the cotton used are identically the same, and most important of all I may be quoted as saying that up to this time the frames have never been stopped for repairs.

In summarizing the advantages of long draft, I would like to call to your attention four important facts:

1—A saving of $1 to $1.50 per spindle per year in the manufacture of yarn by the elimination of processes in speeders.

2—An additional saving due to the fact that the operative can handle additional frames on account of less creeling.

3—Less stock in the process of manufacturing at inventory time.

4—Elimination of all singles that could be made in spinning, as single roving can be used, and it is so much coarser and stronger than there is not the possibility of breaking back in the creel.

Results have been so satisfactory on the 5,000 spindles we have installed, that within the next few months we hope to have a total of 27,000 spindles.

Something About Rayon

(Continued from Page 7)

guish, he may be prejudiced against all rayon constructions. If you could go through a plant which has been engaged for a number of years in the handling and dyeing of rayon and the manufacture of goods from it, you would be better able to understand how many processes and what careful handling are required to develop properly its possibilities.

You need have no doubts as to the advantages in use of a properly dyed rayon fabric. It can be produced dyed in absolutely fast vat colors, the same as are used in the instance of cotton. It will compete in length of wear with goods made from any of the other fibres, unless subjected to a direct abuse when wet. It has a luster as great as, if not greater than, natural silk. It will retain that luster in wear and through successive launderings. It will not turn yellow or ivory with age, as much silk does. It does not become brittle or tender in use. Our agent in Mexico City told us that he and his partner had worn shirts made of our rayon materials while traveling all over Mexico, where they had been subjected to all sorts of laundering, including washing in running brooks, and that they had lasted two years, which was longer than any shirts had ever lasted them before, whether made of cotton, linen, wool, or silk. Similar experiences are general, and while rayon fabrics when wet have less tensile strength than some other fabrics, they regain their original strength at once when dry, and at all times, even wen wet, the strength is ample for any usual or customary handling such as fine wash goods ordinarily receive, and they can suffer only from direct abuse or a deliberate attempt to break the material.

Quality Test Necessary.

I believe the time will come when you gentlemen will begin to ask as to the kind of rayon used in the goods offered you so that you may know that it is the proper kind for the purpose intended, will insist that all the fibre shall be "A" quality and will refuse to handle the product of mill mixing rayon from several different sources. The point of these observations will be emphasized by experience. Familiarity of buyers with cotton and other well known materials enables them to discriminate and judge competitive fabrics and competitive prices, but they are only now having opportunity to acquire similar knowledge as to rayon constructions. The purchase of rayon fabrics on a price basis instead of the quality test which should be applied to such merchandise may lead to the possession of goods of little use or merit. The peculiar handling of the fibre, the THREE—Something about rayon control of temperature, humidity and tension as it is dyed, wound and woven into piece goods, and the softness, touch and "bloom" given to other fabric by proper finishing, are what give attractiveness and value to rayon materials; which those qualities absent, the goods have little distinction or attractiveness, no matter what the price.

Recommend Closing Manchester Mills.

Manchester, England—Directors of spinning mills representing 20,000,000 spindles placed their proposals before Federation of Master Spinners. United action was promised.

Short-time committee recommended that all spinning mills be closed down for a whole week, beginning May 3, to relieve severe depression.

Cotton Goods

New York.—The cotton goods markets continued slow during the week. Only a few large sales were reported. The price situation showed very little change from the previous week. Buying was again generally confined to small orders for prompt delivery. Mills operated under the difficulty of being unable to plan production for only a short time ahead. The late spring in most sections has delayed normal trade in retail lines.

Curtailment of production showed a considerable increase during the week. Many of the cloth mills in South Carolina announced short time schedules and similar announcements are expected from more of them within a short time. In New England, mills again reduced production. It is believed that the smaller output will have a good effect on the market and that the situation can be kept well in hand if the mills refuse to accumulate stocks.

Print cloths sold at 7¾ cents for spots of 38½-inch 64x60s and at 7⅝ cents for June deliveries. July goods were available at 7½ cents. Sales of 68x72s were made at 8¾ cents for spots. There was some inquiry for 80 squares that did not result in business as buyers were trying to do better than 11 cents, the ruling price for spots in some quarters. Elsewhere ¼ cent higher is asked. It is now possible to secure 72x76s at 9¾ cents for contracts and 9⅞ cents for spots. Narrow cloths sold at 5 cents for 56x52s.

There was very little demand for any of the staples in sheetings and prices were unchanged. Some business is being done quietly on special constructions of brown goods by agents who are not in a position to say much at this time. Most of this business has gone to Southern mills without the intervention of brokers.

There was some moderate inquiry for pajama checks in spot and nearby 72x80s at 9½ cents. Such bids were generally turned down, with five-eighths asked. May-June together had sold at one-half. May 64x60s sold at 7⅝ cents. The market on 88x88 11¾ cents.

Outside of reports of some interest in 90x60 carded broadcloths at under the recent quotations, there were few evidences of activity. Most centers continued to hold the 90x60 carded at 10¾ cents; there had been bids of one-half and one-quarter. Other quotations were practically unchanged. Fall River sold some 88x48 carded stripes at 9¾ cents.

In fine goods markets reports stated that there was very little being done. Bale lot orders were heard of constantly; but mills have arrived at the point where they are not so free in entertaining low bids on this sort of business.

Demand for cotton duck was reported as lifeless in most quarters. Where business is offered it is stated to be on such low price levels that agent sare not hesitating to act a little firmer. At the same time the hunger for business is leading some mills to accept small lot orders at prices that make others despair of an early recovery of more stable conditions.

Inquiries made to test out the sateen markets showed that buyers' ideas are ½ cent a yard under what mills will accept that are willing to listen to offers at low figures to keep machinery occupied and no business has resulted.

Business has been done on medium twist voiles in moderate quantities out of stock at 10½ cents to 11 cents. The buying was done by a few converters in need of lines for early June. Some slack twist goods can be had very well under 9 cents and are not attracting buyers at the moment.

Cotton goods prices were quoted as follows:

Print cloths, 28-in., 64x64s	5¾
Print cloths, 28-in., 64x60s	5½
Print cloths, 27-in., 64x60s	5½
Gray g'ds., 38½-in., 64x64s	8¼
Gray goods, 39-in., 68x82s	8¾
Gray goods, 39-in., 80x80s	11½
Brown sheetings, 3-yard	12½
Brown sheetings, 4-yard	10¾
Brown sheetings, stand.	13½
Ticking, 8-oz.	22
Denims	17½
Staple ginghams, 27-in.	9

Alexandria Cotton Goods Stocks Declining.

After fifteen consecutive months of advancement Alexandria's bonded warehouse stocks of cotton goods commenced a downward movement in March, declining in the course of the month from 6,606 tons or 19,338 bales and cases to 6,249 tons or 18,256 bales and cases, states a report to the Department of Commerce from Trade Commissioner Richard A. May, Alexandria. Present stocks, notwithstanding, continue alarmingly high in comparison with normal conditions and stocks recorded just a year ago, Viz. 2,256 tons or 7,885 bales and cases. The entire trade, however is perceptibly much more optimistic than for months, and with the post-Ramadan (mid-April) holidays local and interior demand is expected to reach more than normal producreach more than normal proportions.

The Yarn Market

Philadelphia, Pa.—It was another dull week in the yarn market and conditions as a whole showed no change from those which have prevailed for the past month or so. The weakness in cotton and the general predictions of another large cotton crop have strengthened the yarn consumers opinion that they can buy cheaper yarns later. In the meanwhile, business being done is confined almost entirely to hand to mouth buying for filling in purposes. Buyers are taking yarns only as they need them. There was some scattered inquiry throughout the week for yarns for delivery from four to six weeks ahead, but prices offered were too low to induce active trading.

The amount of yarn being handled in small sales for prompt shipment is moderately large and in many cases has enabled mills to keep running on orders. Southern spinners have expressed a determination to curtail production rather than accumulate stocks and it is believed that they will folow this courge.

The price situation continued to shoow a good deal of irregularity. The price list published in this market is generally regarded as nominal. Spinners prices are still considerably above those here.

There has been no improvement in combed and mercerized yarns. The mills of Gaston county continue to curtail and report that the demand for yarns is very light.

Prices reported here were as follows:

Southern Two-Ply Chain Warps.

8s	32	a
10s	33	a
12s	33½	a
16s	34	a35
20s	35½	a36
24s	38	a
26s	39	a40
30s	44½	a43
40s	52	a53
40s ex.	58	a60
50s	67	a63

Southern Two-Ply Skeins.

8s	32	a
10s	32½	a
12s	33	a
14s	33½	a
16s	34	a35
20s	35	a35½
24s	38	a
26s	39	a
30s	41	a42
36s	50	a
40s	51	a52
40s ex.	58	a60
50s	66	a67
60s	77	a
Tinged Carpet 3 and 4-ply	26½	a27
White Carpet 3 and 4-ply	31	a32

Part Insulated Waste Yarns.

6s, 1-ply	26	a
8s 2, 3, and 4-ply	26½	a
10s, 1-ply and 3-ply	28	a
12s, 2-ply	29	a
16s, 2-ply	32	a
20s, 2-ply	33	a
26s, 2-ply	37½	a38
30s, 2-ply	39	a40

Duck Yarns—3, 4 and 5-Ply.

8s	32	a
10s	33	a
12s	33	a
16s	34½	a35
20s	36	a

Southern Single Chain Warps

10s	32	a
12s	33	a
14s	33½	a
16s	34½	a35
20s	35	a36
24s	38	a
26s	39	a
30s	42	a43
40s	53	a

Southern Single Skeins.

6s	31	a
8s	31½	a
10s	32	a
12s	32½	a
14s	33	a
16s	34	a
18s	34	a
20s	34½	a
22s	35	a
24s	36	a36½
26s	37	a37½
28s	39½	a
30s*	38	a38½
30s	39½	a40
40s	48½	a

Southern Combed Peeler Skeins, Etc.—Two-Ply.

16s	51	a
20s	53	a
30s	58	a
36s	63	a
40s	65	a67
50s	72	a67
60s	78	a80
70s	88	a90
80s	1 05	a1 10

Southern Combed Peeler Cones.

10s	42	a
12s	43	a
14s	44	a
16s	45	a
18s	46	a
20s	47	a
22s	48	a49
24s	51	a
26s	51½	a
28s	52	a
30s	55	a
32s	57	a
34s	59	a60
36s	62	a
28s	63	a
40s	64	a
50s	70	a72
60s	78	a80
70s	88	a90
80s	1 05	a

Eastern Carded Peeler Thread—Twist Skeins—Two-Ply.

20s	48	a
22s	49	a
24s	50	a
30s	54	a
36s	57	a
40s	61	a
45s	68	a
50s	73	a

Eastern Carded Cones.

10s	37	a
12s	38	a
14s	39	a
20s	40	a
22s	43	a
26s	47	a
28s	49	a
30s	51	a

Southern Spinners' Bulletin.

The weekly bulletin of the Southern Yarn Spinners' Association says:

Yarn prices remain unchanged, although cotton has shown a decline over last week's levels. Inquiries are more numerous, but trading still remains light.

The cloth mills in South Carolina are rapidly instituting their 25 per cent curtailment. Already material curtailment has been made among yarn mills, and unless business develops, and prices improve there is a likelihood of a much more drastic reduction in operations.

Belgian Rayon Production.

Total rayon production in Belgium is approximately 4,500,000 kilos per year, and about 8,500 people are employed in the industry, states a report to the Department of Commerce from Consul William C. Burdett, Brussels. At the close of 1925, the Belgian plants were exporting in the neighborhood of 275,400 kilos per month.

Want Department

For Sale

1—40" Kitson Two Beater Breaker Lapper with Automatic Feeder. Excellent condition.
1—40" Kitson Single Beater Finisher Lapper with Kirschner Beater. Excellent condition.

P. O. Box 119
Atlanta, Ga.

Wanted

Position as overseer carding. Have worked from the bottom up. Have had 20 years hard experience in carding. Overseer 8 years on one job. Best of references. Married, sober. Address A. G., care Southern Textile Bulletin.

For Sale

Two Breton Minerol Equipments, used only 30 days. First-clsss condition; cost us $125.00 each; our price $75.00 each. Shelby Cotton Mills, Shelby, N. C.

For Sale

3 No. 90 Universal Quillers, 20 spindles each.
10 No. 50 Universal Winders, 6" tubes.
18 No. 50 Universal Winders, Small Cones.
3 No. 30 Foster Cone or Tube Winders, motor or belt drive.
4 No. 12 Foster Winders, Cones or Tubes.

Reply C. T. Mfg. Co., Care Southern Textile Bulletin.

Wanted

N. C. State College Textile graduate desires position as Assistant Manager of Southern Mill. Has had seven years' experience in different mills since graduation, five years of which has been as superintendent and assistant superintendent. Now employed as superintendent but wishes to make a change. Is also a graduate of King's Business College, and is familiar with mill cost accounting. Best of references. Address A. O. H., care Southern Textile Bulletin.

Salesman Wanted

Leading textile chemical concern wants a salesman for Southern territory to demonstrate and sell sizing and finishing materials. Give full details in first letter concerning present employment, experience, age and references. Address Box XXX, care Southern Textile Bulletin.

Rayon Handling Machinery For Sale at Sacrifice

1 McKinney Warp Splitting Machine.
1 Sipp Winder, 64 Spindles.
7 gangs, 140 spindles, Universal No. 90 Winders.
29,000 6-inch Maple Quiller Bobbins for Whitin long chain quiller.

The above machinery is brand new and has never been run. Can be inspected at Burlington, N. C., and will sell in part or as whole.

Communicate with J. E. Carrigan, Burlington, N. C.

Overseer Wanted

We have opening for overseer twisting on tire yarns. Give full particulars and references. Apply "G. A. N.," care Southern Textile Bulletin.

WELL DRILLING AND DEEP WELL PUMPS

We do the engineering, and have had 32 years experience solving water problems satisfactorily for textile mills.

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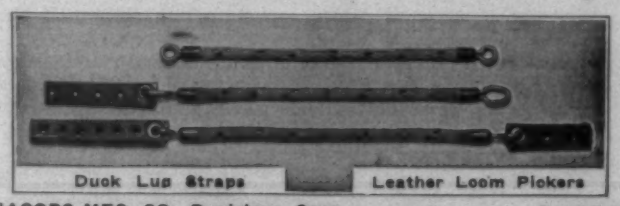

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An Interesting Story of Cotton Mill Life

For Sale by Clark Publishing Company, Charlotte, N. C.

Spartanburg Mills Curtail

The following scedule of curtailment has been announced by mills in Spartanburg County, S. C.

Arkwright—Curtailment of 25 per cent in output will begun beginning the first week in May by shutting down a portion of the looms, according to R. Z. Cates.

Chesnee—Curtailment, the details of which have not yet been decided will be begun the first week in May and continued throughout the month, John A. Law announced.

Clifton—Beginning the first week in May, the three mills belonging to the Clifton Manufacturing Company will be shut down on Fridays and Saturdays throughout the entire month, is was announced by J. Choice Evins.

Fairmont — Beginning the first week in May, the output will be curtailed 25 per cent. The exact schedule under which this will be done is not yet quite complete, G. W. Grier, vice-president and general manager, said.

Glendale—Curtailment in production will be made beginning the first week in May, it was announced by W. E. Lindsay. Whether it will be a flat 25 per cent reduction or a shutdown for one or for two days each week has not been decided yet.

Inman—A shut down on Friday and Saturday of each week will probably be inaugurated early in May, James A. Chapman announced. Some change in the schedule may be made, but curtailment will be carried out.

Pacolet—Beginning the first week in May the plants will be closed Friday and Saturday for a period of 60 days and perhaps longer. The New Holland, Georgia, plant will also be placed on a curtailed schedule in a short time, Victor M. Montgomery announced.

Saxon—Curtailment in output will be made during the month of May. How much this curtailment will be or how it will be effected has not yet been decided, John A. Law said.

Whitney—A shut down on Fridays and Saturdays for an indefinite period will begin during the first week of May, A. S. Thomas, secretary and general manager announced.

The Pacific Mill and Bleachery at Lyman is already operating on a curtailed schedule, as is also the number 2 mill at Beaumont.

Says Rome is Textile Center

Rome, Ga.—Rome is the center of an area upon which is being focused the textile mill development that is moving from New England to the South, R. A. Morgan, agent of Southern Brighton Mills, a branch of Brighton Mills, Passaic, N. J., declared in an address before the Rome Rotary Club.

"This present centralization about Rome is thoroughly sensible and is reasonable and right," said Mr. Morgan. "It will be maintained for some time to come. The next five or ten years will surprise the most optimistic, as is foreshadowed by the interest manifested today by Northern mills looking for locations around here."

New England's advantage over the South as a textile manufacturing section has been eliminated, according to Mr. Morgan, who pointed out the attraction in this section for such mills.

What industries seeking locations in this section desire was summarized by Morgan as being: fair treatment, encouragment of new as well as old industries, low taxation, sane legislation, wise and just administration of the law, adequate and modern public service facilities such as schools, roads, playgrounds, transportation, churches, banking, police and fire protection. He said that real mill men do not ask for special privileges.

"They do not expect a subsidy," he said. "They do not suppose that you can guarantee them a profitable return on their investment. They are willing to take their chances in the markets alongside of associates and competitors in the race for business and profits."

Mr. Morgan declared that there must be close co-operation between the farmer, the buyer and the manufacturer in the production of cotton, urging that all interests concerned with the cotton industry labor to improve the grade and staple of the raw product. He told how this could be accomplished.

"Will you rise to the opportunity that is yours to make Rome the Queen City of Georgia's cotton industry?" asked Mr. Morgan, and for his own part pledged his support.

Standardization of Quills, Bobbins and Shuttles

For the purpose of bringing the subject of standardization to the people primarily interested, Benjamin Eastwood, Jr., of the Benjamin Eastwood Company, Paterson, N. J., recently called a conference of the quill bobbin and shuttle manufacturers of Paterson.

Since the conference the standardization of quill, bobbin and shuttle sizes has received some very careful attention. It is evident that if these parts could be standardized, many apparent advantages would result; not only for the manufacturer of this class of merchandise but also for the silk manufacturers themselves.

Now, when the manufacturer of silk orders, quill or shuttles, he must order far enough in advance to guarantee delivery on time or he is delayed because his and almost every other order is a special one.

If this scheme of operation could be changed, many delays and other annoyances would be eliminated to a large extent. Probably costs could be somewhat reduced. Standardization of sizes would also permit the manufacturer of quills, bobbin and shuttles to make them up well in advance of a probable rush and every one would be happy because of the service rendered and the time saved.

The plan has been well received and it is deemed wise to go further with the subject as rapidly as possible. In the meantime, it is hoped others interested will voice their opinion by addressing Mr Eastwood.

EMPLOYMENT BUREAU

The fee for joining our employment bureau for three month is $2.00, which will also cover the cost of carrying a small advertisement for two weeks.

If the applicant is a subscriber to the Southern Textile Bulletin and his subscription is paid up to the date of his joining the employment bureau the above fee is only $1.00

During the three months' membership we send the applicant notices of all vacancies in the position which he desires and carry small advertisements for two weeks.

We do not guarantee to place every man who joins our employment bureau, but we do give them the best service of any employment bureau connected with the Southrn Textile Industry.

WANT position as superintendent of yarn mill. Am now overseer of cardind and have had long and practical experience. Good references. No. 4820.

WANT position as overseer carding or spinning, prefer spinning. Practical carder and spinner who can get results. Excellent references. No. 4821.

WANT position as superintendent of small mill or overseer weaving in large mill, or assistant superintendent. Experxienced on wide variety of weaves, can get production at right cost. References. No. 4822.

WANT position as superintendent, would take large weave room. Age 48, long service as both superintendent and overseer. Now employed and can give good references. No. 4823.

WANT position as overseer carding. Age 32, single, good habits. I. C. S. graduate in carding and spinning. Would like job in Texas. Now employed. Best of references. No. 4824

WANT position as superintendent of weave mill, or would consider large weave room job Have been on present job as overseer weaving for 7 years. Good references. No. 4825.

WANT position as overseer carding. Long experience as second hand and overseer. Now employed as overseer and giving satisfaction, but want larger place. References. No. 4826.

WANT position in mill office as paymaster, shipping clerk or timekeeper. Beginner in accountancy. Seven years experience. Age 26, married, now employed. No. 4827.

WANT position as overseer weaving on jacquard, plain work or drills. Have had 6 years experience on plain goods and drills, 10 years on jacquard damask and fancy rayon draperies. Now employed. Best of references. No. 4828.

WANT position as superintendent or manager. Practical man who has been superintendent for long period of years and can give satisfactory references to show excellent past record. No. 4829.

WANT position as overseer weaving, plain or fancy work. Fifteen years experience as overseer and can give excellent references. No. 4830.

WANT position as overseer carding. Now employed. Have had ten years experience as carder. Good references. No. 4831.

WANT position as second hand or overseer carding. Age 34, 20 years in card room. Have taken course in textile and have excellent references. No. 4832.

WANT position as overseer carding or spinning. Long experience in both rooms and can give satisfactory results. Can furnish references to show character and ability. No. 4833.

WANT position as overseer spinning, spooling and warping. I. C. S. graduate, 12 years experience. Age 39. Now employed but can change on short notice. No. 4835.

WANT position as overseer carding. Now employed as carder but wish larger place. Can handle carding or spinning or both. Have been in mill almost all my life. Twelve years as overseer. Also had long experience as overhauler. Good references. No. 4836.

WANT position as overseer cloth room. Now employed as night overseer in napping and finishing room; 12 years experience, including work on sheetings, print cloths, folding and winding. Understand upkeep of napper machines. Want day job. No. 4837.

WANT position as superintendent of yarn mill. Am practical spinner and familiar with all counts and cotton. Now employed as superintendent and giving satisfaction. Would take spinners' place in large mill. Good references. No. 4838.

WANT position as shipping or supply clerk, timekeeper or general office man. Experienced in this work and also familiar with weave room, cloth room and machine shop. Have worked in both white and colored weave mills and in yarn mills. Good references. No. 4840.

WANT position as superintendent. Am textile graduate of N. C. State College and have been superintendent of a good mill for the past 6 years. Best of references. No. 4841.

WANT position as superintendent or assistant superintendent, or overseer fancy weaving. Long experience, can get results and can keep down costs and seconds. No. 4842.

WANT position as assistant superintendent, overseer weaving or designer. Thoroughly familiar with fine and fancy weaving and can give references to show caracter and ability. No. 4843.

WANT position as superintendent. Now employed as superintendent, but wish larger place. My experience includes long service as superintendent and overseer. Best of references. No. 4844.

WANT position as superintendent of weave mill on plain or fancy work or would take large weave room. My experience covers wide variety of weaves and I can produce excellent results at the right price. No. 4845.

WANT position as overseer small card room or second hand in larger room. Have had 27 years experience in card room; 9 years as section man, and second hand. On present job as second hand for 2 years. Age 45, married, sober. Good references. No. 4846.

WANT position as superintendent, or overseer carding and spinning. Practical man of long experience who thoroughly understands carding and spinning. Best of references. No. 4848.

WANT position as superintendent of yarn mill, or would take carding or spinning in large mill. Good carder and spinner, can manage help and can produce quality work at low cost. No. 4849.

WANT position as overseer of carding or spinning or superintendent of small yarn mill. Qualified by experience and training to handle work in competent manner. Good references. No. 4850.

WANT position as overseer weaving. Prefer Draper or Stafford looms. Have had several years experience as erecting man. Stafford Company. Familiar with dobby work. Experience covers wide range of goods. Best of references. No. 4851.

WANT position as overseer of cloth room. Experienced man who understands cloth room work and who has had long experience in a number of good mills. Excellent references. No. 4852.

WANT position as overseer carding. Age 28, 8 years experience in card room on colored work and some on hosiery I. C. S. student. Prefer North Carolina or Virginia. Good references. No. 4853.

WANT position as overseer carding in large mill. Now employed but have good reasons for changing. Age 36, married, of good habits. Good references. No. 4854.

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Baling Presses—
Dunning & Boschert Press Co., Inc.
Economy Baler Co.
Rex Engineering Corp.

Bands and Tape—
American Textile Banding Co.

Baskets—
Charles Bond Company.
W. T. Lane & Bros.
Wckwire Spencer Steel Co.

Beaming and Warping Machinery—
Barber-Colman Co.
Cocker Machinery & Foundry Co.
Draper Corporation.
Easton & Burnham Machine Co.
T. C. Entwistle Co.
Saco-Lowell Shops.

Beam Heads—
T. C. Entwistle Co.
Frank Mossberg Corp.
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.

Beams (Section)—
Washburn

Beams (All Steel)—
T. C. Entwistle Co.
Frank Mossberg Corp.
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.

Beaming Combs—
T. C. Entwistle Co.
Easton & Burnham Machine Co.
Steel Heddle Mfg. Co.

Bearings (Roller)—
Charles Bond Company
Hyatt Roller Bearing Co.

Bearings (Shaft)—
Charles Bond Company
Hyatt Roller Bearing Co.
William Sellers & Co., Inc.
Woods, T. B. & Sons Co.

Bearings (Textile Machinery)—
Charles Bond Company
Hyatt Roller Bearing Company

Belt Conveyors—
Link-Belt Co.
Wickwire Spencer Steel Co.

Belt Conveyors (Spiral and Woven)—
Wickwire Spencer Steel Co.

Belt Tighteners—
Charles Bond Company
Link-Belt Co.
Woods, T. B. & Sons Co.

Belting—
The Akron Belting Co.
Charles iBond Company
Charlotte Leather Beltng Co.
Druid Oak Belting Co.
Graton & Knight Mfg. Co.
E. F. Houghton & Co.
Edward R. Ladew Co.

Belt Cement—
Charles Bond Company
Edward R. Ladew Co.
Graton & Knight Mfg. Co.
E. F. Houghton & Co.

Belt Dressing—
Charles Bond Company

Belt Lacing—
Charles Bond Company
Chicago Belting Co.
Edward R. Ladew Co.
E. F. Houghton & Co.
Graton & Knight Mfg. Co.

Belting (Link)—
Charles Bond Company.
Link-Belt Co.

Bicorbonate of Soda—
Mathieson Alkali Works, Inc.

Bleacheries—
Joseph Bancroft & Sons Co.

Bleaching Materials—
Arabol Mfg. Co.
Arnold, Hoffman & Co., Inc.
L. Sonneborn Sons, Inc.
National Oil Products Co., Inc.
Bosson & Lane.
J. B. Ford Co.
National Aniline & Chemical Co.
United Chemical Products Co.
Wolf, Jacques & Co.

Bobbin Holders—
Fournier & Lemoine.

Bobbins and Spools—
American Bobbin Co.
David Brown Co.
Courtney, Dana S. Co.
Draper Corporation.
Lestershire Spool & Mfg. Co.
Lowell Shuttle Co.
Frank Mossberg Corp.
Mossberg Pressed Steel Corp.
Walter L. Parker Co.
Steel Heddle Mfg. Co.

Boxes—
Wilts Veneer Co.

Box Shooks—
Wilts Veneer Co.

Blowers and Blower Systems—
Carrier Engneering Co.
Parks-Cramer Co.

Breton Mineral Oil—
Borne, Scrysmer Co.

Brushes—
Atlanta Brush Co.
Curtis & Marble Machine Co.

Brushing Machines—
Curtis & Marble Machine Co.

Bobbin Stripper—
Terrell Machine Co.

Calenders—
H. W. Butterworth & Sons Co.
B. F. Perkns & Son, Inc.
Textile Finishing Machinery Co.

Calender Roll Grinders—
B. S. Roy & Son Co.

Cards—
Saco-Lowell Shops.
Whitin Machine Works
Woonsocket Machine & Press Co., Inc.

Card Clothing—
Ashworth Bros.
Charlotte Mfg. Co.
Howard Bros. Mfg. Co.
Wickwire Spencer Steel Co.

Card Grinding Machinery—
Easton & Burnham Machine Co.
Dronsfield Bros.
T. C. Entwistle Co.
Roy, B. S. & Son Co.
Saco-Lowell Shops.
Whitin Machine Works
Woonsocket Machine & Press Co., Inc.

Carrier Aprons—
Link-Belt Co.
Wickwire Spencer Steel Co.

Caustic Potash—
A. Klipstein & Co.

Caustic Soda—
Arnold, Hoffman & Co., Inc.
A. Klipstein & Co.
Mathieson Alkali Works, Inc.

Chain Belts and Drives—
Charles Bond Company.
Link-Belt Co.
Morse Chain Co.

Chemicals—
L. Sonneborn Sons, Inc.
J. B. Ford Co.
Hart Products Corp.
A. Klipstein & Co.
Mathieson Alkali Works, Inc.
National Oil Products Co.
Seydel Chemical Co.
Seydel-Woolley Co.

Cleaning Agents—
Oakley Chemical Co.
Woodley Soap Mfg. Co.

Cloth Presses—
Economy Baler Co.

Clutches (Friction)—
Charles Bond Company
Textile Finishing Machinery Co.
Woods, T. B. Sons Co.

Cloth Winders and Doublers—
Curtis & Marble Machine Co.

Clutch Spindles—
Fournier & Lemoine.

Coal Handling Machinery—
Link-Belt Co.

Combs—
Steel Heddle Mfg. Co.

Combs (Beamers, Warpers, Slashers)—
T. C. Entwistle Co.
Easton & Burnham Machine Co.

Commission Merchants—
Catlin & Co.
The Farish Co.
J. H. Lane & Co.
Mauney Steel Co.
Paulson, Linkroum & Co.
Ridley Watts & Co.

Compressors (Air)—
Allis-Chalmers Mfg. Co.

Condensers—
Allis-Chalmers Mfg. Co.

Conditioning Machines—
American Moistening Co.

Conduit Fittings—
Chicago Fuse Mfg. Co.

Cones (Paper)—
Sonoco Products Co.

Cone Vice Couplings—
William Sellers & Co., Inc.

Conveying Systems—
Link-Belt Co.

Coolers (Air)—
——See Humidifying Apparatus.

Cotton—
Lesser-Goldman Cotton Co.
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Cotton Machinery—
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Barber-Colman Co.
Collins Bros. Machine Co.
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Dixon Lubricating Saddle Co.
Draper Corporation.
Easton & Burnham Machine Co.
T. C. Entwistle Co.
Fales & Jenks Machine Co.
H. & B. American Machine Co.
Hopedale Mfg. Co.
Rodney Hunt Machine Co.
National Ring Traveler Co.
Roy & Son, B. S.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Stafford Co., The
Terrell Machine Co.
Tolhurst Machine Works.
Universal Winding Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.
Woonsocket Machine & Press Co., Inc.

Cotton Openers and Lappers—
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Cotton Softeners—
Arabol Mfg. Co.
Arnold, Hoffman & Co., Inc.
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Hart Products Corp.
E. F. Houghton & Co.
A. Klipstein & Co.
National Oil Products Co.
Seydel Chemical Co.
Seydel-Woolley Co.
L. Sonneborn Sons, Inc.
Wolf, Jacques & Co.

Cotton Waste Machinery—
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

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Charles Bond Company.
William Sellers & Co., Inc.
Woods, T. B. Sons Co.

Cranes—
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Roy, B. S., & Son Co.
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Newport Chemical Works.
National Aniline & Chemical Co.
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Franklin Process Co.

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Westinghouse Electric & Mfg. Co.

Electric Hoits—
Allis-Chalmers Mfg. Co.
Link-Belt Co.

Electric Lighting—
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Electric Motors—
Allis-Chalmers Mfg. Co.
Charles Bond Company.
General Electric Co.
Westinghouse Electric & Mfg. Co.

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——See Architects and Mill Engineers.

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——See also Ventilating Apparatus.

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J. D. Hollingsworth.

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A. Klipstein & Co.
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Seydel-Woolley Co.
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——See Dyeing, Drying, Bleaching and Finishing.

Flat Wall Paint—
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U. S. Gutta Percha Paint Co.

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Wood's T. B. Sons Co.

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Wood's T. B. Sons Co.

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Collins Bros. Machine Co.
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Woonsocket Machine & Press Co., Inc.
Whitin Machine Works.

Flyer Pressers and Overhaulers—
Southern Spindle & Flyer Co.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Flyers—
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Frames—
Steel Heddle Mfg. Co.

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Wood's T. B. Sons Co.
See Clutches.

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Chicago Fuse Mfg. Co.

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Link-Belt Co.

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Charles Bond Company
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Gears-Silent—
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Ferguson Gear Co.

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Ferguson Gear Co.

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Thomas Grate Bar Co.

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Link-Belt Co.

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Roy, B. S. & Son Co.

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Textile Mill Supply Co.

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——See Heddles and Frames.

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Carrier Engineering Corp.
Parks-Cramer Co.
R. I. Humidifier & Ventilating Co.

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Merrow Machine Co., The

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Merrow Machine Co., The

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E. F. Houghton & Co.

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E. H. Jacobs Mfg. Co.

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Arnold, Hoffman & Co., Inc.
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Draper Corporation.
Hopedale Mfg. Co.
Stafford Co., The

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Frank Mossberg Corp.
Mossberg Pressed Steel Corp.

Loom Drop Wires—
Crompton & Knowles Loom Works.
Hopedale Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
R. I. Warp Stop Equipment Co.

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Garland Mfg. Co.
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Edward R. Ladew Co.
E. H. Jacobs Mfg. Co.
Garland Mfg. Co.
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Greansboro Loom Reed Co.
Steel Heddle Mfg. Co.

Loom Supplies—
Chas. Bond Co.
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Textile Finishing Machinery Co.

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Curtis & Marble Machine Co.
Textile Finishing Machinery Co.

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H. W. Butterworth & Sons Co.
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Metal Paint—
E. I. du Pont de Nemours & Co., Inc.

Meters—
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Mill Architects—
——See Architects.

Mill Lighting—
——See Electric Lighting.

Mill Starches—
Arnold, Hoffman & Co., Inc.
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Penick & Ford, Ltd.
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Mill Supplies—
Charles Bond Company.
Dixon Lubricating Saddle Co.
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Garland Mfg. Co.
Textile Mill Supply Co.
Thomas Grate Bar Co.

Mill White—
E. I. du Pont de Nemours & Co., Inc.

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National Oil Products Co.

Napper Clothing—
Wickwire Spencer Steel Co.

Napper Roll Grinders—
Allis-Chalmers Mfg. Co.
General Electric Co.
B. S. Roy & Son Co.
Westinghouse Electric & Mfg. Co.

Oils—
Arnold, Hoffman & Co., Inc.
E. F. Houghton & Co.
A. Klipstein & Co.
National Oil Products Co.
N. Y. & N. J. Lubricant Co.
L. Sonneborn Sons, Inc.
Wolf, Jacques & Co.

Oil Burners—
Scott-Newman Oil Burner Co.

Oils (Hyroscopic)—
National Oil Products Co.

Oils (Rayon)—
National Oil Products Co.

One-Piece Furnace Linings—
Carolina Refractories Co.

Opening Machinery—
H. & B. American Machine Co.
Saco-Lowell Shops.
Whitin Machine Works.

Overhaulers—
Saco-Lowell Shops.

Overseaming and Overedging Machines—
Southern Spindle & Flyer Co.

Paints—
Aluminum Co. of America.
Tripod Paint Co.
U. S. Gutta Percha Paint Co.

Patents—
Paul B. Eaton.
Siggers & Siggers.

Perforated Machinery Guards—
Wickwire Spencer Steel Co.

Perforated Metals—
Wickwire Spencer Steel Co.

Picker Gears—
Cocker Machinery & Foundry Co.

Pickers (Leather)—
Charles Bond Company.
Edward R. Ladew Co.
E. F. Houghton & Co.
E. H. Jacobs Mfg. Co.
Garland Mfg. Co.
Graton & Knight Mfg. Co.

Picker Sticks—
Charles Bond Company.
Garland Mfg. Co.

Piece Dyeing Machinery—
H. W. Butterworth & Sons Co.
Cocker Machine & Foundry Co.
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Textile Finishing Machinery Co.

Pipe and Fittings—
Parks-Cramer Co.

Portable Elevators—
Link-Belt Co.

Power Transmission Machinery—
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Charles Bond Company.
Hyatt Roller Bearing Co.
Link-Belt Co.
Morse Chain Co.
William Sellers & Co., Inc.
Wood's, T. B. Sons Co.

Preparatory Machinery (Cotton)—
H. & B. American Machine Co.
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Pickers and Lappers—
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Pinboards—
Rodney Hunt Machine Co.
Washburn.

Porcelain Guides and Parts—
Rodney Hunt Machine Co.
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Presses—
Economy Baler Co.
Rex Engineering Co.
Saco-Lowell Shops.

Pulleys (Cast Iron)—
Charles Bond Company.
William Sellers & Co., Inc.
Wood's, T. B. Sons Co.

Pumps—
Blackmer Rotary Pump Co.

Pumps (Boiler Feed; also Centrifugal)—
Allis-Chalmers Mfg. Co.
Sydnor Pump & Well Co.

Presses—
Collins Bros. Machine Co.

Quill Boards—
Washburn.

Quillers—
Crompton & Knowles Loom Works
Eastwood, Benj. Co.
Universal Winding Co.
Whitin Machine Works.

Quill Cleaners—
Terrell Machine Co.

Receptacles—
Economy Baler Co.
Rogers Fibre Co.

Reels—
Cocker Machinery & Foundry Co.
H. W. Butterworth & Sons Co.
Rodney Hunt Machine Co.
Frank Mossberg Corp.

Rings—
Whitinsville Spinning Ring Co.

Ring Spinning Frames—
Fales & Jenks Machine Co.
H. & B. American Machine Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co.
Whitin Machine Works.

Ring Travelers—
Dary Ring Traveler Co.
National Ring Traveler Co.
Victor Ring Traveler Co.
U. S. Ring Traveler Co.

Roller Leather—
A. C. Lawrence Leather Co.

Rolls—
American Bobbin Co.
H. W. Butterworth & Sons Co.
Collins Bros. Machine Co.
Fales & Jenks Machine Co.
Rodney Hunt Machine Co.
The Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Textile Finishing Machinery Co.

Rolls (Metal)—
Rodney Hunt Machine Co.

Rolls (Rubber)—
Rodney Hunt Machine Co.

Rolls (Wood)—
Rodney Hunt Machine Co.
Washburn.

Roller Bearings—
Charles Bond Company.
Hyatt Roller Bearing Co.

Roving Cans and Boxes—
Denison Mfg. Co.
Rogers Fibre Co.

Roving Machinery—
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Saddles—
Dixon Lubricating Saddle Co.

Sanitary Equipment—
Vogel, Joseph A. Co.

Sanitary Fountains—
——See Drinking Fountains.

Scallop Machines—
Merrow Machine Co.

Scouring Powders—
Ford, J. B. Co.
Bosson & Lane
National Oil Products Co.

Scrubbing and Cleaning Powders—
The Denison Mfg. Co.

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Mathieson Alkali Works, Inc.

Section Beam Heads—
Frank Mossberg Corp.
Mossberg Pressed Steel Corp.

Selling Agents—
Woodward, Baldwin & Co.
Deering, Milliken & Co.
Reeves Bros.

Selling Agents (Cotton Goods)—
Amory, Browne & Co.
Curran & Barry.
Deering, Milliken & Co.
Hunter Manufacturing & Commision Co
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Leslie, Evans & Co.
Reeves Bros.
Wellington, Sears & Co.

Sewing Machine—
Merrow Machine Co.

Sewing Machines and Supplies—
Curtis & Marble Machine Co.

Shafting, Hangers, Etc.—
——See Power Transmission Machinery

Shafting—
Fafnir Bearing Co.
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Wood's T. B. Sons Co.

Shear Grinders—
B. S. Roy & Son Co.

Shell Rolls—
Merrow Machine Co.
Washburn.

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Merrow Machine Co.

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Shuttles—
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Silent Chain Drive—
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Arnold, Hoffman & Co., Inc.
Arabol Mfg. Co.
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Sizing Compounds—
Arnold, Hoffman & Co., Inc.
Bosson & Lane
Corn Products Refining Co.
Drake Corp.
General Dyestuff Corp.
Hart Products Corp.
A. Klipstein & Co.
National Oil Products Co.
John P. Marston & Co.
Seydel Chemical Co.
Seydel-Woolley Co.
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Wolf, Jacques & Co.

Slashers—
Charles B. Johnson

Slasher Combs—
Easton & Burnham Machine Co.
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Steel Heddle Mfg. Co.
Textile Finishing Machinery Co.

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Arabol Mfg. Co.
Arnold, Hoffman & Co., Inc.
Bosson & Lane.
General Dyestuff Corp.
E. F. Houghton & Co.
National Oil Products Co., Inc.
Seydel Chemical Co., Inc.
L. Sonneborn Sons, Inc.
U. S. Bobbin & Shuttle Co.
United Chemical Products Corp.
Wolf, Jacques & Co.

Softeners—
Arnold, Hoffman & Co., Inc.
E. F. Houghton & Co.
National Oil Products Co., Inc.
Seydel-Woolley Co.
L. Sonneborn Sons Co.

Skewers—
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Courtney, Dana S. Co.
T. C. Entwistle Co.
Walter L. Parker Co.
U. S. Bobbin & Shuttle Co.

Slashers and Equipment—
Saco-Lowell Shops.

Soaps—
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Arnold, Hoffman & Co., Inc.
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United Chemical Products Co.

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Mathieson Alkali Works, Inc.

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National Oil Products Co.
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Fales & Jenks Machine Co.
Saco-Lowell Shops.
Whitin Machine Works.
Southern Spindle & Flyer Co.
Woonsocket Machine & Press Co., Inc.

Spindle Repairers—
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Fournier & Lemoine.
Fales & Jenks Machine Co.
Southern Spindle & Flyer Co.

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Steel Heddle Mfg. Co.
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Spoolers—
Draper Corporation.
Easton & Burnham Machine Co.
Eastwood, Benj. Co.
Saco-Lowell Shops.
Whitin Machine Works.

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American Textile Banding Co.
Barber Mfg. Co.
Georgia Webbing & Tape Co.

Squeeze Rolls—
H. W. Butterworth & Sons Co.
Rodney Hunt Machine Co.
Textile Finishing Machinery Co.

Starch—
Corn Products Refining Co.
Arnold, Hoffman & Co., Inc.
Keever Starch Co.
Penick & Ford, Ltd.
Stein, Hall & Co.

Stencil Machines—
A. J. Bradley Mfg. Co.

Stencil Papers—
A. J. Bradley Mfg. Co.

Stripper Cards—
L. S. Watson Mfg. Co.
Wickwire Spencer Steel Co.

Switch Boxes—
Chicago Fuse Mfg. Co.

Tanks—
H. W. Butterworth & Sons Co.
Rodney Hunt Machine Co.
Textile Finishing Machinery Co.

Tape—
Georgia Webbing & Tape Co.

Temperature Regulators—
American Schaeffer & Budenberg Corp.

Textile Castings—
H. W. Butterworth & Sons Co .
Cocker Machinery & Foundry Co.
Textile Finishing Machinery Co.

Textile Machinery Specialties—
H. W. Butterworth & Sons Co.
Cocker Machinery & Foundry Co.
Rodney Hunt Machine Co.
Hyatt Roller Bearing Co.
Textile Finishing Machinery Co.

Textile Soda—
J. B. Ford Co.
Mathieson Alkali Works.

Temples—
Draper Corporation.
Hopedale Mfg. Co.

Textile Apparatus (Fabrics)—
B. F. Perkins & Son, Inc.
Henry L. Scott & Co.

Textile Dryers—
American Moistening Co.

Top Beams—
Frank Mossberg Corp.

Top Rolls For Spinning Frames—
Washburn.

Trademarking Machines—
Curtis & Marble Machine Co.

Transfer Stamps—
Kaumagraph Co.

Transmission Belts—
Charles Bond Company.
Edward R. Ladew Co.
E. F. Houghton & Co.
Graton & Knight Mfg. Co.

Transmission Machinery—
Allis-Chalmers Mfg. Co.
Hyatt Roller Bearing Co.
William Sellers & Co., Inc.
Wood's T. B. Sons Co.

Toilets—
Vogel, Jos. A. Co.

Transmission Silent Chain—
Link-Belt Co.
Morse Chain Co.

Trucks (Mill)—
Rogers Fibre Co.
W. T. Lane & Bros.

Trucks For Pin Boards—
Washburn.

Tubes (Paper)—
Sonoco Products Co.

Turbines (Steam)—
Allis-Chalmers Mfg. Co.

Twister Rings—
Whitinsville Spinning Ring Co.

Twisting Machinery—
Collins Bros. Machine Co.
Draper Corporation.
Fales & Jenks Machine Co.
Saco-Lowell Shops.
Whitin Machine Works.

Twisting Tapes—
Barber Mfg. Co.

Underwear Machines—
Merrow Machine Co.

Ventilating Apparatus—
American Moistening Co.
Parks-Cramer Co.

Ventilating Fans—
B. F. Perkins & Son, Inc.

Warpers—
Barber-Colman Co.
Crompton & Knowles Loom Works
Draper Corporation.
Easton & Burnham Machine Co.
Saco-Lowell Shops.
T. C. Entwistle Co.

Warp Dressing—
Arnold, Hoffman & Co., Inc.
Bosson & Lane.
Draper Corporation.
Hart Products Corp.
E. F. Houghton & Co.
National Oil Products Co.
Seydel-Woolley Co.
L. Sonneborn Sons Co.

Warp Stop Motion—
Draper Corporation.
Hopedale Mfg. Co.
R. I. Warp Stop Equipment Co.

Warp Tying Machinery—
Barber-Colman Co.

Warper Shell—
Cocker Machinery & Foundry Co.

Warpers (Silk or Rayon)—
Eastwood, Benj. Co.
Sipp Machine Co.

Washers (Fibre)—
Rogers Fibre Co.

Waste Reclaiming Machinery—
Saco-Lowell Shops.
Whitin Machine Works.
Woonsocket Machine & Press Co., Inc.

Waste Presses—
Economy Baler Co.
Rex Engineering Co.

Water Controlling Apparatus—
Rodney Hunt Machine Co.

Water Wheels—
Allis-Chalmers Mfg. Co.

Weighting Compounds—
Arabol Mfg. Co.
Bosson & Lane.
General Dyestuff Corp.
Hart Products Corp.
Marston, Jon. P.
National Oil Products Co.
Wolf, Jacques & Co.
Seydel-Woolley Co.
L. Sonneborn Sons, Inc.

Well Drillers—
Sydnor Pump & Well Co.

Whizzers—
Tolhurst Machine Works.

Winders—
Easton & Burnham Machine Co.
Eastwood, Benj. Co.
Saco-Lowell Shops.
Universal Winding Co.

Winders (Skein)—
Sipp Machine Co.

Windows—
Carrier Engineering Corp.
Parks-Cramer Co.

Window Guards—
Wickwire Spencer Steel Co.

Wrenches—
Frank Mossberg Corp.
Wickwire Spencer Steel Co.

Yardage Clocks—
T. C. Entwistle Co.

Yarns—
Paulson, Linkroum & Co.
Mauney-Steel Co.

Yarn Tension Device—
Eclipse Textile Devices, Inc.

Yarn Presses—
Economy Baler Co.

Yarn Testing Machines—
Scott, Henry L. & Co.